

# AMERICAN SOCIETY OF PEDIATRIC OTOLARYNGOLOGY

## NINTH ANNUAL MEETING

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**MAY 10, 11 & 12, 1994**  
**THE BREAKERS HOTEL**  
**PALM BEACH, FLORIDA**

**AMERICAN SOCIETY OF PEDIATRIC  
OTOLARYNGOLOGY  
NINTH ANNUAL MEETING  
CME INFORMATION**

The American Society of Pediatric Otolaryngology (ASPO) is ~~no longer~~ independently accredited to give CME credit hours. CME credit hours will be awarded by the American Academy of Otolaryngology - Head and Neck Surgery Foundation (AAO-HNSF).

An ASPO evaluation sheet is enclosed in your packet. This must be completed, legible, and turned in for Category 1 CME credit hours to be awarded. Evaluations may be turned in at the meeting in designated areas.

CME credit hours will be computed by the AAO-HNSF and awarded in total at year's end. No separate ASPO CME certificates will be distributed.

Questions on CME for the ASPO Ninth Annual meeting may be directed to ~~Orval E. Brown, MD~~ or Sheila Seid.

The American Academy of Otolaryngology-Head and Neck Surgery Foundation, Inc., is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education for physicians.

The American Academy of Otolaryngology-Head and Neck Surgery Foundation, Inc., designates this continuing medical education activity for **16** credit hours in Category 1 of the Physician's Recognition Award of the American Medical Association.

**AMERICAN SOCIETY OF  
PEDIATRIC OTOLARYNGOLOGY**

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**AMERICAN SOCIETY OF  
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**SPECIAL EVENTS**

<u>Time</u>	<u>Event</u>	<u>Location</u>
<b>Tuesday, May 10</b>		
5:00 - 7:00 pm	Presidents' Reception & Poster Viewing	Starlight A, C, D
<b>Wednesday, May 11</b>		
7:00 - 10:00 pm	ASPO Banquet	Beach Club

**AWARDS**

**Charles F. Ferguson Award  
for Clinical Research**

Awarded to

Giann-Chyuan Chen, M. D.

Acquired Laryngeal Changes:

Pathology Study Using Serial Macrosections

Paper Presentation: Thursday, May 12, 11:08 am

**Basic Science Award**

Awarded to

John F. Laurenzo, M. D.

The Effect of Rigid Internal Fixation

on Midfacial Growth in Rabbits

Paper Presentation: Thursday, May 12, 11:40 am

**AMERICAN SOCIETY OF  
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**OFFICERS OF THE SOCIETY**

**President**

Kenneth M. Grundfast, M. D.  
Washington, D. C.

**President-Elect**

Robert J. Ruben, M. D.  
Bronx, NY

**Secretary**

James S. Reilly, M. D.  
Wilmington, DE

**Treasurer**

Rodney P. Lusk, M. D.  
St. Louis, MO

**Editor-Historian**

Sylvan E. Stool, M. D.  
Pittsburgh, PA

**Past-President**

Allan B. Seid, M. D.  
San Diego, CA

**Additional Directors**

Richard J. H. Smith, M. D.  
Iowa City, IO  
William Crysdale, M. D.  
Toronto, Ontario, Canada

## **ASPO COMMITTEES**

### **AUDIT COMMITTEE**

Kenneth Geller, M. D., Chairperson  
James Arnold, M. D.  
Jerome Thompson, M. D.

### **CME SUBCOMMITTEE**

Orval Brown, M. D., Chairperson  
Richard Hubbell, M. D.  
Jacob Friedberg, M. D.  
Sukgi Choi, M. D.

### **EDUCATION COMMITTEE**

James Reilly, M. D., Chairperson  
Michael Cunningham, M. D.  
Jacob Friedberg, M. D.  
Lyon Greenberg, M. D.  
Jerome Thompson, M. D.  
Orval Brown, M. D.

### **FELLOWSHIP COMMITTEE**

Robin Cotton, M. D., Chairperson  
Allan Seid, M. D.  
David Parsons, M. D.  
Ellen Friedman, M. D.  
Andrew Inglis, M. D.

### **FINANCE COMMITTEE**

Lawrence Tom, M. D.  
Glenn Isaacson, M. D.  
Mark Richardson, M. D.  
Allan Seid, M. D.  
Immediate Past President

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**MEMBERSHIP AND  
CREDENTIALS COMMITTEE**

Roland Eavey, M. D., Chairperson  
Walter Belenky, M. D.  
Michael Williams, M. D.  
Ronald Deskin, M. D.  
James Cuyler, M. D.  
Benjamin White, M. D.  
Donald Kearns, M. D.

**NOMINATING COMMITTEE**

Allan Seid, M. D., Chairperson  
Joyce Schild, M. D.  
Roland Eavey, M. D.  
Sally Shott, M. D.

**PROGRAM COMMITTEE**

Kenneth Grundfast, M. D., Chairperson  
Richard Smith, M. D.  
Ralph Wetmore, M. D.

**RESEARCH COMMITTEE**

Patrick Brookhouser, M. D.,  
Chairperson  
Robert Ruben, M. D.  
N. Wendell Todd, M. D.  
Thomas Balkany, M. D.  
Margaretha Casselbrant, M. D.

**LIASON COMMITTEE**

Peter Koltai, M. D., Chairperson  
Lauren Holinger, M. D.  
Joyce Schild, M. D.  
Seth Pransky, M. D.  
Margaret Kenna, M. D.

**AMERICAN SOCIETY OF  
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**PAST PRESIDENTS**

Seymour R. Cohen, M. D	.1985 - 1986
Francis I. Catlin, M. D. ....	.....1986 - 1987
Gerald B. Healy, M. D	.....1987 - 1988
Robin T. Cotton, M. D. ...	..1988 - 1989
Mark A. Richardson, M. D	1989 - 1990
Charles D. Bluestone, M. D	..1990 - 1991
William O. Potsic, M. D.	1991 - 1992
Allan B. Seid, M. D	.1992 - 1993
<i>Ken Grundfest</i>	<i>1993- 1994</i>

**AMERICAN SOCIETY OF  
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**ON-SITE REGISTRATION**

The COSM registration desk will be open as follows:

Friday, May 6th	3:00 am - 7:00 pm
Saturday, May 7th through Thursday, May 12th	7:00 am - 4:30 pm

**EXHIBITS**

Commercial exhibits will be located in the Magnolia Room, Gold Room and Venetion Ball Room.

**FUTURE MEETINGS**

- 1995 Durango, CO
- 1996 Grand Cypress, FL

**AMERICAN SOCIETY OF  
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**COMMITTEE MEETINGS**

<b>MEETING</b>	<b>TIME</b>	<b>ROOM</b>
<b>TUESDAY, MAY 10, 1994</b>		
Task Force on Respiratory Papillomas	12:00 - 1:00 pm	Seagull A
Fellowship Program Directors Meeting	12:00 - 1:00 pm	Flagler Board Room
Membership & Credentials Meeting	7:00 - 8:00 pm	Seagull C
<b>WEDNESDAY, MAY 11, 1994</b>		
ASPO Board Meeting	7:00 - 8:00 am	Flagler Board Room
ASPO Business Meeting	12:00 - 1:00 pm	Mediterranean Room
American Academy of Pediatrics: Section Otolaryngology/ Bronchoesophagology Board Meeting	5:00 - 6:00 pm	South A
Membership & Credentials	5:00 - 6:00 pm	Starlight Office
Finance Committee	5:00 - 6:00 pm	Flagler Boardroom
Fellowship Committee	5:00 - 6:00 pm	Gulfstream F
Education Committee	5:00 - 6:00 pm	Gulfstream E
CME Committee	5:00 - 6:00 pm	Gulfstream D
Audit Committee	5:00 - 6:00 pm	Starlight C
Program Committee	5:00 - 6:00 pm	North Mezzanine
Nominating Committee	5:00 - 6:00 pm	2 West A
Research Committee	5:00 - 6:00 pm	South B
<b>THURSDAY, MAY 12, 1994</b>		
ASPO Board Meeting	7:00 - 8:00 am	Flagler Board Room
ASPO Business Meeting	12:00 - 1:00 pm	Starlight A

## **AMERICAN SOCIETY OF PEDIATRIC OTOLARYNGOLOGY**

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The American Society of Pediatric Otolaryngology is a professional society of physicians dedicated to the care of ear, nose, and throat disorders in children. The Annual Meeting and Scientific Program provides a forum for dissemination of recent advances in research and clinical care, and other issues relating to the care of ear, nose, and throat disorders in children. Oral and poster presentations at the scientific session will be complemented by the ASPO Compendium of Case Reports.

**Objectives:** Participants in the Program will learn of recent advances in airway disorders, sinus disease, tonsil and adenoid disorders, otitis media, hearing and communication problems, ear surgery, head and neck lesions in children, and other associated areas.

**Who Should Attend:** Physicians, nurses, scientists and associated persons in professional disciplines with special interest in the ear, nose, and throat care of children should attend. Included are audiologists, speech and language pathologists, and other allied health professionals.

**AMERICAN SOCIETY OF  
PEDIATRIC OTOLARYNGOLOGY**

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**PROGRAM SUMMARY**

**SCIENTIFIC SESSIONS**

Wednesday, May 11, 1994

1:00 - 5:00 pm

Mediterranean Ballroom

Thursday, May 12th

8:00 - 12:00 noon

1:00 - 5:00 pm

Starlight A

**POSTER PRESENTATIONS**

Tuesday, May 10, 1994

5:00 - 7:00 pm

Poster viewing and  
Presidents' Reception

Starlight A,C and D

**AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION  
AND  
AMERICAN SOCIETY OF PEDIATRIC OTOLARYNGOLOGY**

- 1:00 pm CONTACT ENDOSCOPIC MICROSURGERY: A NEW  
TECHNIQUE FOR ENDOSCOPIC EXAMINATION OF THE  
LARYNX  
Mario Andrea, M. D.
- 1:20 pm **Discussion: William J. Richtsmeler, M. D**  
MODERATOR: LAUREN D. HOLINGER, M. D.
- 1:25 pm INTERARYTENOID HEIGHT IN INFANTS AND CHILDREN  
Richard J. H. Smith, M. D.
- 1:35 pm LARYNGEAL HAMARTOMA - A RARE CONGENITAL  
LARYNGEAL ABNORMALITY  
Edward D. Fine, M. D., Ph.D.
- 1:45 pm SUSTAINED RESPONSE TO INTERFERON ALPHA-2a IN  
A CHILD WITH AGGRESSIVE PAPILLOMATOSIS  
John Fornadley, M. D.
- 1:55 pm PRIMARY CLOSURE OF PERSISTENT  
TRACHEOCUTANEOUS FISTULA IN CHILDREN.  
Peter Kaiser, M. D.
- 2:05 pm **Discussion: Lauren D. Holinger, M. D.**  
MODERATOR: ELLEN M. FRIEDMAN, M. D.
- 2:15 pm IATROGENIC TRACHEOMALACIA: AN INEVITABLE  
CONSEQUENCE OF LONG-TERM POSITIVE PRESSURE  
James P. Cuyler, M. D.
- 2:25 pm LONG AND SHORT TERM AIRWAY COMPLICATIONS  
OF JET VENTILATION IN NEONATES  
Pamela J. Nicklaus, M. D.
- 2:35 pm THE TRADEOFF BETWEEN AIRWAY RESISTANCE AND  
OPTICAL RESOLUTION IN PEDIATRIC RIGID  
BRONCHOSCOPY  
Sam Marzo, M. D.
- 2:45 pm Discussion: Ellen M. Friedman, M. D.
- 2:55 pm Concluding Remarks  
Introduction of New President:  
Haskins K. Kashima, M. D.
- 3:00 pm BREAK

- MODERATOR:** DAVID S. PARSONS, M. D.  
University of Missouri, Columbia, MO
- 3:20 pm RECURRENT RESPIRATORY PAPILLOMAS-PILOT  
DATA FROM THE ASPO/ABEA/ACOG TASK FORCE  
Craig S. Derkay, M. D., Norfolk, VA
- 3:28 pm THE PEDIATRIC TRACHOBRONCHIAL FOREIGN BODY:  
STILL AN ELUSIVE DIAGNOSIS  
Marcelle Sulek, M. D., Robert J. Scholl, III, Ellen M.  
Friedman, M. D., Newton O. Duncan, M. D., Houston, TX
- 3:36 pm SOCIOECONOMIC RISK FACTORS FOR FOREIGN BODY  
INGESTIONS OR ASPIRATION  
Ellis M. Arjmand, M. D., Harlan R. Muntz, M. D., St.  
Louis, Mo
- 3:44 pm MANAGEMENT OF DISTAL TRACHEAL STENOSIS  
Roger Nuss, M. D., Richard Jonas, M. D., Dwight T.  
Jones, M. D., Boston, MA
- 3:52 pm PHYSICIAN SURVEY ON THE CARE OF CHILDREN  
WITH TRACHEOTOMIES  
Audie L. Woolley, M. D., Harlan R. Muntz, M. D., Debbie  
Prater, RN, St. Louis, Mo.
- 4:00 pm Discussion: David S. Parsons, M. D.**
- MODERATOR:** GEORGE H. ZALZAL, M. D.  
Children's Hospital, Washington, D. C.
- 4:10 pm SINGLE STAGE LARYNGOTRACHEOPLASTY SURVEY  
William E. Wood, M.D., Danville, PA, Allan Seid, M. D.,  
Donald Kearns, M. D., Seth Pransky, M. D., San Diego,  
CA
- 4:18 pm EXTRALUMINAL LARYNGOTRACHEAL FIXATION WITH  
ABSORBABLE MINIPLATES  
Ayal Willner, M. D., Saul M. Modlin, M. D., Robert J.  
Ruben, M. D., Bronx, NY
- 4:26 pm LARYNGOTRACHEOPLASTY: THE AVOIDANCE OF  
PARALYSIS  
Michael A. Rothschild, M. D., Dennis Cotkamp, M. D.,  
Robin T. Cotton, M. D. Cincinnati, OH

- 4:34 pm POST-OPERATIVE CARE FOLLOWING ONE STAGE LARYNGOTRACHEOPLASTY  
Nancy M. Bauman, M. D. Tanya Oyos, M. D., Iowa City, IA, Michael J. Biavati, M. D., Dallas, TX, Richard JH Smith, M. D., Iowa City, IA
- 4:42 pm ANALYSIS OF VOICE OUTCOMES FOLLOWING SURGERY FOR LARYNGOTRACHEAL STENOSIS  
Randall A. Clary, M. D., St. Louis, MO, Angela Pengill, Martin Baily, FRCS, Nicholas Jones, FRCS, David Albert, FRCS, Jayne Comins, Julia Sedda, London England
- 4:50 pm **Discussion: George H. Zalzal, M. D**
- 5:00 pm Adjourn

**RECURRENT RESPIRATORY PAPILLOMAS-PILOT DATA  
FROM THE ASPO/ALA/ABEA/ACOG TASK FORCE****Craig S. Derkay, M.D., FACS, FAAP, Norfolk, Virginia**

An association between maternal genital warts and laryngeal papilloma in the child has been shown in multiple, retrospective studies. However, respiratory papillomatosis is a rare disease and genital warts in child bearing women are relatively common. Controversy exists as to whether a cesarean-section is warranted in a pregnant woman with genital warts. Under the sponsorship of ASPO, ALA, ABEA, and ACOG a Task Force on Respiratory Papillomas has been formed. Questionnaires have been prepared and distributed to families of children affected with laryngeal papillomas, otolaryngologists who manage children with laryngeal papillomas, and perinatologists who manage high-risk pregnant women with condylomata acuminata. The pilot data obtained from these surveys are reported.

**THE PEDIATRIC TRACHEOBRONCHIAL FOREIGN BODY:  
STILL AN ELUSIVE DIAGNOSIS****Marcelle Sulek, M.D., Robert J. Scholl III, Ellen M. Friedman,  
M.D., Newton O. Duncan, M.D., Houston, Texas**

Tracheobronchial foreign bodies in children may not present with classic signs and symptoms. A ten year retrospective review of 120 cases of pediatric patients with a diagnosis of foreign body aspiration was performed. The number of cases which did not include the usual signs and symptoms of foreign body aspiration highlights the need for a high index of suspicion for this diagnosis. For example, 25% did not have a suggestive history of foreign body aspiration, 10% had normal x-ray findings, and 11% had been treated initially for other diagnosis. Delayed diagnosis resulted in a higher incidence of intraoperative and post operative difficulties. The subtle aspects of determining the correct diagnosis of foreign body aspiration in children and the need for timely and appropriate management are stressed.

**SOCIOECONOMIC RISK FACTORS FOR FOREIGN BODY INGESTION OR ASPIRATION****Ellis M. Arjmand, M.D., Harlan R. Muntz, M.D., St. Louis, MO**

Social and economic risk factors for foreign body (FB) aspiration or ingestion are assessed through a retrospective review of 124 patients. Preschool-aged children are significantly more likely to be uninsured than are school-aged children with the same diagnosis ( $P < 0.01$ ). Similarly, the data strongly suggest that preschool-aged children with FB aspiration or ingestion are more likely to live in single parent households. These findings indicate that lack of access to private health care resources may place preschool-aged children at an increased risk of FB aspiration or ingestion. The effects of other factors, such as median family income, maternal age, and access to a private primary care physician, are also discussed. Recommendations are presented for counselling parents of children who are at increased risk, and for increasing public awareness of these factors.

**MANAGEMENT OF DISTAL TRACHEAL STENOSIS**

**Roger C. Nuss, M.D., Dwight T. Jones, M.D., Richard Jonas, M.D., Boston, MA**

Distal tracheal stenosis is a challenging problem which requires a multi-disciplinary approach for evaluation and treatment. Twelve patients with a diagnosis of distal tracheal stenosis have been treated with resection and end-to-end anastomosis; two of these cases involved the carina. Our success and complication rate has been better than many reports in the literature. Clinical presentation, endoscopic and radiographic evaluation, and successful operative techniques and management strategies will be discussed. Major and minor complications are reported, and suggestions are made for improved outcomes based on the experience at our institution.

**PHYSICIAN SURVEY ON THE CARE OF CHILDREN WITH TRACHEOTOMIES**

**Audle L. Woolley, M.D., Harlan R. Muntz, M.D., Debbie Prater, R.N., St. Louis, MO**

A questionnaire was distributed this year to practicing pediatric otolaryngologists from the membership of the American Society of Pediatric Otolaryngology to determine the range of care of the pediatric tracheotomy patient. This survey is constructed for the purpose of evaluating changing practice protocols by professionals involved in the care of children with tracheotomies. Eighty questionnaires representing 2100 tracheotomies per year were analyzed. The questionnaire addressed number of trachs performed per year, use of trach management teams, operative techniques, postoperative care, intensive care unit usage, use of monitoring devices, as well as patient education and use of home care. These results are analyzed and compared with results obtained in a similar study published in 1991.

**SINGLE STAGE LARYNGOTRACHEOPLASTY SURVEY**

**William E. Wood, M. D., Danville, PA, Allan Seld, M. D.,  
Donald Kearns, M. D., Seth Pransky, M. D., San Diego, CA**

Single Stage Laryngotracheoplasty (SSLTP) questionnaires were forwarded to 42 individual or group pediatric otolaryngologists, all members of ASPO. Twenty-six questionnaires were returned, for an overall response rate of 62%. The focus of the questionnaire was SSLTP as an alternative to airway reconstruction with prolonged stenting for subglottic stenosis. The questionnaire addressed such issues as: experience and success with SSLTP, surgical candidacy, preoperative evaluation, postoperative management, and factors felt to be associated with failure. Inquiry was made regarding SSLTP as an alternative to the anterior cricoid split procedure. Survey results will be presented with proposed guidelines for SSLTP based on respondents first hand experience with this procedure.

**EXTRALUMINAL LARYNGOTRACHEAL FIXATION WITH ABSORBABLE MINIPLATES**

**Ayal Willner, M.D., Saul Modlin, M.D., Robert J. Ruben, M. D. Bronx, N.Y.**

Surgery for severe laryngotracheal stenosis has relied on the use of intraluminal stents. This requires a tracheotomy and is associated with failure rates of up to forty percent. To attain better results, external fixation with metal plates has been studied, but may limit tracheal growth or need removal. The use of absorbable miniplates, made of polydioxanone (PDS), to fixate the cricoid after anterior and posterior split was studied in rabbits. These plates showed superior fixation of the cricoid when compared to controls. The average intraluminal area of the experimental group was 20.9 mm, while that of the controls was 13.5 mm. Absorption occurred by twelve weeks. This method of reconstruction shows promise in the treatment of severe laryngotracheal stenosis.

**LARYNGOTRACHEOPLASTY: THE AVOIDANCE OF PARALYSIS**

**Michael A. Rothschild, M.D., Dennis Cotkamp, M.D., Robin T. Cotton, M.D., Cincinnati, Ohio**

Following single stage laryngotracheoplasty (LTP), the child is dependent on an indwelling nasotracheal tube for seven to ten days. The use of neuromuscular blocking agents for complete paralysis to avoid displacement of the tube has been frequently described. It is our preference to avoid this, and use titrated intravenous sedation instead. A paralyzed child will neither be able to exhibit respiratory distress if the tube becomes obstructed, nor breathe spontaneously if it becomes dislodged. Prolonged weakness after blockade of more than a few hours and the difficulty of titrating sedation are other problems seen with the use of paralysis.

We review our experience with accidental extubation after single stage LTP. This is the most feared sequelae of postoperative agitation, often invoked to support the use of paralysis. We conclude from this review that it is safe and effective to avoid the use of longterm neuromuscular blockade following laryngotracheoplasty.

**POST-OPERATIVE CARE FOLLOWING ONE STAGE  
LARYNGOTRACHEOPLASTY**

**Nancy M. Bauman, MD, Tanya L. Oyos, MD, Michael J. Blavatl, MD, Richard J.H. Smith, MD, Iowa City, Iowa**

One stage laryngotracheoplasty is now the preferred method of laryngotracheal reconstruction as it consolidates correction of airway stenosis with excision of the tracheotomy tract. Post-operative intubation for 5-7 days ensures graft stabilization. In young children, this usually necessitates prolonged pharmacologic neuromuscular blockade which can be associated with pulmonary compromise and muscular weakness. To minimize untoward side effects, we have adopted a protocol utilizing intravenous non-depolarizing neuromuscular blockade titrated by ulnar nerve stimulation and withheld for 6-8 hours daily during daytime hours. Anxiety and agitation are controlled during this time with bedside parental reassurance, distracting audiovisual ploys and intravenous sedation. Since the daily cessation of neuromuscular blockade has been instituted, our patients demonstrate less pulmonary compromise and improved post-extubation neuromuscular strength. This protocol has demonstrated success with both anterior and posterior laryngotracheal cartilage interposition grafts.

**ANALYSIS OF VOICE OUTCOMES FOLLOWING SURGERY FOR LARYNGOTRACHEAL STENOSIS**

**Randall A. Clary, MD, Angela Pengilly, Martin Bailey, FRCS, Nicholas Jones, FRCS, David Albert, FRCS, Jayne Comins, Julia Sedda, John Evans, St. Louis, MO**

Voice function following laryngotracheal reconstruction procedures has been characterized as highly variable by previous authors. In this study, we retrospectively followed up children at least 2 years after their original surgery. The assessment included review of medical history, home parental questionnaires, standardized taped voice samples, electrolaryngography, videotaped laryngeal stroboscopy, and pulmonary function tests. Voice function was characterized by blinded voice assessments using the Vocal Profile Analysis by three speech therapists. Endoscopic findings of the larynges were compiled from videotape inspections blinded to voice by three consultant otolaryngologists.

Out of 108 patients with laryngotracheal procedures since 1978, 59 could be contacted. Fifty of the 59 families completed home evaluations; 33 of these completed hospital evaluations. All aspects of these evaluations were completed except for 5 children who refused endoscopy and 8 who could not perform PFT's.

Eight of 33 children had normal voices. Of the 13 voice parameters found to be abnormal in the remaining patients, harshness and whisper were identified in over half of the population. The children with the most aberrant voice function typically use supraglottic phonation to compensate for glottic insufficiency. The major endoscopic findings were vocal fold immobility, abnormal subglottis, anterior commissure blunting, and supraglottic phonatory vibration.

Risk factors for poor long-term voice function were investigated staging the preoperative severity of illness, by separating and identifying the effects of co-morbidities, and comparing voice function to endoscopic findings. The results suggest that procedures involving complete laryngofissure which may be complicated by anterior commissure blunting should be avoided when possible.

- 8:00 am            **PRESIDENTIAL ADDRESS**  
Kenneth M. Grundfast, M. D., Children's National  
Medical Center, Washington, D. C.
- 8:10 am            **GUEST OF HONOR**  
Charles D. Bluestone, M. D.,  
Children's Hospital of Pittsburgh, Pittsburgh, PA
- MODERATOR:** HARLAN R. MUNTZ, M. D.  
St. Louis Children's Hospital, St. Louis, MO
- 8:40 am            **CORRELATION OF CLINICAL SINUSITIS SIGNS AND  
SYMPTOMS TO IMAGING FINDINGS IN PEDIATRIC  
PATIENTS**  
Scott C. Manning, M. D., Debra Phillips, RN, BSN,  
Michael J. Biavati, M. D., Dallas, TX
- 8:48 am            **CORRELATION BETWEEN CT-SCAN FINDINGS AND  
TISSUE PATHOLOGY OF ETHMOID SINUSES IN  
CHILDREN**  
Felizardo S. Camilon, Jr., M. D.,FAAP, Orange, CA
- 8:56 am            **ENDOSCOPIC SURGICAL MANAGEMENT OF CHRONIC  
SINUSITIS IN CHILDREN**  
Nigel RT Pashley, MB, BS, FRCS(D), FAAP, Denver, CO
- 9:04 am            **MIDDLE MEATAL STENOSIS IN PEDIATRIC FESS:  
CAUSES, PREVENTION AND MANAGEMENT**  
Rande H. Lazar, M.D., Ramzi T. Younix, M. D.,  
Memphis, TN
- 9:12 am            **ADENOIDS AND PEDIATRIC CHRONIC SINUSITIS**  
John Kokesh, M. D., Mark Richardson, M. D. Arnold  
Smith, M. D., Taya Higgins, RN, Seattle, WA
- 9:20 am            **EOSINOPHILIA IN CHRONIC CHILDHOOD SINUSITIS**  
Fuad M. Barood, M. D., Baltimore, MD, Tony Hughes,  
M. D., Washington, DC., Ralph Hruban, M. D., P.  
MacDowell, M. D. Robert M. Naclerio, M. D.,  
Baltimore, MD
- 9:28 am            **DISCUSSION: Harlan R. Muntz, M. D.**
- 9:40 am            **BREAK**
- MODERATOR:** Margaret A. Kenna, M. D.  
Children's Hospital, Pittsburgh, PA

- 10:00 am THE EFFECT OF INTRAVENOUS DEXAMETHASONE (IVD) ON MORBIDITY IN PEDIATRIC ADENOTONSILLECTOMY (AT)  
Max M. April, M. D., Noreen D. Callan, RN, PNP, Donna M. Nowak, BSN, MPS, Mark A. Hausdorff, MD, Stony Brook, NY
- 10:08 am INTRAOPERATIVE STEROIDS IN TONSILLECTOMY  
Laurie A. Ohlms, M. D., Robert R. Wilder, M. D., PhD, Brian Weston, Boston MA
- 10:16 am EFFICACY OF NON-STEROIDAL ANTI-INFLAMMATORY AGENTS IN MANAGEMENT OF POST-TONSILLECTOMY PAIN: A PILOT STUDY  
Robert Dattolo, M. D., Earl Harley, M. D., San Diego, CA
- 10:24 am OUTPATIENT TONSILLECTOMY AND ADENOIDECTOMY: A SAFE AND COST-EFFECTIVE PROCEDURE  
Suzanne W. Yee, M. D., Charles M. Bower, M. D., Gary Petrus, M. D., Robert Weiber, M. D., Little Rock, AR
- 10:32 am OUTCOME VERSUS COST IN PATIENTS WITH TONSILLAR AND ADENOIDAL HYPERTROPHY AND OBSTRUCTED BREATHING DURING SLEEP  
Scott C. Manning, M. D., Debra Phillips, BSN, RN, Michael Biavati, M. D., Dallas, TX
- 10:40 am SLEEP FLUOROSCOPY FOR LOCALIZATION OF UPPER AIRWAY OBSTRUCTION IN CHILDREN  
Sharon E. Gibson, M. D., Chicago, IL, Charles M. Myer, III, M. D., Janet L. Strife, M. D., David M. O'Connor, BA, Cincinnati, OH
- 10:48 am **DISCUSSION: Margaret A. Kenna, M. D**
- MODERATOR: Steven R. Gray, M. D.  
University of Utah, Salt Lake City, UT
- 11:00 am LARYNGEAL DYSFUNCTION IN INFANTS  
James D. Sidman, M. D., Richard M. Levinson, M. D., Carl A. Brown, M. D., Minneapolis, MN
- 11:08 am ACQUIRED LARYNGEAL CHANGES: PATHOLOGY STUDY USING SERIAL MACROSECTIONS  
Lauren D. Holinger, M. D., Chicago, IL, Jiann-Chyuan Chen, M. D., Taipei, Taiwan

- 11:16 am LARYNGEAL ELECTROMYOGRAPHY (LEMG) FINDING  
IN IDIOPATHIC CONGENITAL BILATERAL VOCAL CORD  
PARALYSIS (ICVCP)  
Robert Berkowitz, FRACS, Melbourn, Australia
- 11:24 UNILATERAL ENDOSCOPIC EPIGLOTTOPLASTY FOR  
SEVERE LARYNGOMALACIA  
Steven M. Kelly, M. D., Steven D. Gray, M. D.,  
Salt Lake City, UT
- 11:32 am ORBITAL FRACTURES IN CHILDREN  
Peter J. Koltai, M. D., Ibrahim Amjad, BS, Dale Meyer,  
M. D., Albany NY
- 11:40 am THE EFFECT OF RIGID INTERNAL FIXATION ON  
MIDFACIAL GROWTH IN RABBITS  
John F. Laurenzo, M. D., John W. Canady, M. D., M.  
Bridget Zimmerman, PhD, Richard JH Smith, M. D.,  
Iowa City, IA
- 11:48 am **DISCUSSION: Steven R. Gray, M. D.**
- 12:00 pm LUNCH
- 1:00 pm INVITED GUEST SPEAKER  
Walter E. Nance, M. D.  
Medical College of Virginia, Richmond, VA
- MODERATOR: Kenneth M. Grundfast, M. D.  
Children's National Medical Center, Washington, D. C.
- 1:30 pm THE NATURAL HISTORY OF PROGRESSIVE / FLUCTU-  
ATING SENSORINEURAL HEARING LOSS IN CHILDREN  
Patrick E. Brookhouser, M. D., Omaha, Don W.  
Worthington, PhD., Salt Lake City, UT, William Kelly,  
MS, Omaha, NE
- 1:38 pm NONSURGICAL MANAGEMENT OF "SURGICAL" OTITIS  
MEDIA WITH EFFUSION (OME)  
Richard M. Rosenfeld, M. D., MPH, Brooklyn NY
- 1:46 pm EFFECTIVENESS AND SEQUELAE OF INTERVENTIONS  
OF OTITIS MEDIA WITH EFFUSION (OME)  
Robert J. Ruben, M. D., Bronx, NY
- 1:54 pm ACUTE OTITIS MEDIA AND FACIAL PARALYSIS IN  
CHILDREN  
Clark A. Elliott, M. D., FRCSC, Edmonton, Canada,  
George H. Zalzal, M. D., FRCSC, Washington, DC.,  
Wendy Gottlieb, BA, Charlottesville, VA

- 2:02 pm ACUTE MASTOIDITIS IN CHILDREN 1982 - 1993:  
A RETROSPECTIVE ANALYSIS OF A MODERN  
PERSPECTIVE  
Earl H. Harley, M. D., Washington, D. C.,  
Robert G. Berkowitz, MB, Theo Sdralis, M. D.,  
Melbourne, Australia
- 2:10 pm **DISCUSSION: Kenneth M. Grundfast, M. D.**  
MODERATOR: Linda Brodsky, M. D.  
Buffalo Children's Hospital, Buffalo, NY
- 2:20 pm PEDIATRIC TYMPANOPLASTY: A TEN-YEAR  
EXPERIENCE  
Sujana S. Chandrasekhar, M. D., John W. House, M. D.,  
Los Angeles, CA, Uday Devgan, DS, Washington, DC
- 2:28 pm ENDOSCOPES IN PEDIATRIC CHRONIC EAR SURGERY  
Seth Rosenberg, M. D., Herbert Silverstein, M. D.,  
Michael Hoffer, M. D., Mark Nichols, M. D., Sarasota, FA
- 2:36 pm DELAYED DIAGNOSIS AND FATE OF CONGENITAL  
CHOLESTEATOMA  
Gurpreet S. Ahuja, M. D., Kenneth M. Grundfast, M. D.,  
Washington, DC, Simon C. Parisier, M. D., New York,  
NY, Stephanie Culver, BA, Washington, D. C.
- 2:44 pm EVALUATION OF VERTIGO IN THE PEDIATRIC PATIENT  
Terrance P. Murphy, M. D., FACS, William Boydston,  
M.D., PhD. Atlanta, GA
- 2:52 pm SPEECH PERCEPTION PERFORMANCE IN CONGENI-  
TALLY DEAF CHILDREN WITH COCHLEAR IMPLANTS  
Rodney P. Lusk, M. D., Virginia W. Jenison, MA, CCC-A,  
St. Louis, MO
- 3:00 pm **DISCUSSION: Linda Brodsky, M. D.**
- 3:10 pm BREAK  
MODERATOR: Charles M. Myer, III, M. D.  
Cincinnati Children's Hospital, Cincinnati, OH
- 3:30 pm SOFT-TISSUE SARCOMA OF THE HEAD AND NECK IN  
CHILDREN AND ADOLESCENTS  
Andrew Lyos, M. D., Helmuth Goepfert, M. D., Mario  
Luna, M. D., Norman Jaffe, M. D., Houston, TX

- 3:38 pm IMPROVED SURVIVAL IN HEAD AND NECK  
RHABDOMYOSARCOMA  
Erica R. Thaler, M. D., William Potsic, M. D., Steven D.  
Handler, M. D., Richard Women, M. D., Philadelphia, PA
- 3:46 pm ANGIOFIBROMA: CHANGES IN STAGING AND  
TREATMENT  
Diana Radkowski, M. D., Cleveland, OH, Trevor McGill,  
M. D., Laurie A. Ohlms, M. D., Dwight T. Jones, M. D.,  
Boston, MA
- 3:54 pm LYMPHATIC MALFORMATIONS OF THE HEAD AND  
NECK: A PROPOSAL FOR STAGING  
Lianne M. deSerres, M. D., Kathleen CV Sie, M. D.  
Mark A. Richardson, M. D., Seattle, WA
- 4:02 pm THE ROLE OF EARLY CT SCANNING IN PEDIATRIC  
NECK INFECTIONS  
Phillip W. Saccogna, M. D., Terry L. Good, M. D.,  
James E. Arnold, M. D., Cleveland, OH
- 4:10 pm GRANULOMATOUS LYMPHADENITIS OF THE HEAD  
AND NECK IN CHILDREN  
Dana Suskind, M. D., Steven D. Handler, M. D.,  
Philadelphia, PA
- 4:18 pm DISCUSSION: Charles M. Myer, M. D.**
- MODERATOR: Seth M. Pransky, M. D.  
Childrens Hospital, San Diego, CA
- 4:30 pm THE "HUMMER" - INNOVATIVE SURGICAL INSTRU-  
MENTATION FOR SINUS SURGERY IN CHILDREN  
David S. Parsons, M. D., FAAP, FACS, Columbia, MO,  
Ribbon C. Setliff, III, M. D., North Platte, NE
- 4:38 pm INVASIVE FUNGAL SINUSITIS IN BONE MARROW  
TRANSPLANTATION PATIENTS  
Sukgi S. Choi, M. D., Ralph Quinones, M. D., Gregory J.  
Milmoie, M. D., Washington, D. C.
- 4:46 pm THE ROLE OF ULTRASONOGRAPHY IN THE  
DIAGNOSIS AND MANAGEMENT OF  
RETROPHARYNGEAL INFECTION  
William F. McGuiert, Jr., M. D., Margaret A. Kenna, M. D.,  
FACS, Richard Thebaine, M. D., Pittsburgh, PA

- 4:54 pm      **THE PLOT THICKENS - TREATMENT OF AURAL *P. AERUGINOSA***  
Joseph Dohar, M. D., Margaret A. Kenna, M. D., Robert Wadowsky, ScD, Pittsburgh, PA
- 5:02 pm      **BECKWITH-WIEDEMAN SYNDROME AND AIRWAY OBSTRUCTION**  
Frank L. Rimell, M. D., Andrew M. Shapiro, M. D., Margaret A. Kenna, M. D., Pittsburgh, PA
- 5:10 pm      DISCUSSION: Seth M. Pransky, M. D.**
- 5:20 pm      **ADJOURN**

**CORRELATION OF CLINICAL SINUSITIS SIGNS AND SYMPTOMS TO IMAGING FINDINGS IN PEDIATRIC PATIENTS**

**Scott C. Manning, MD, Debra L. Phillips, BSN, RN, Michael J Blavatl, MD, Dallas, Texas**

Previous studies have shown that plain sinus films do not correlate well with CT scans but results of investigations correlating clinical signs and symptoms with imaging findings are mixed. In the present study, sixty pediatric patients undergoing head CT or MRI for non-sinus related diagnoses had an otolaryngologic exam and a detailed history taken on the day of the imaging procedure. Imaging findings were then correlated with clinical signs and symptoms of rhinitis or sinusitis in a blinded fashion. Fifty percent of patients had no sinus imaging findings and fifty percent showed varying degrees of mucosal thickening. Lack of imaging findings correlated with a lack of clinical findings but mucosal thickening showed no correlation to signs and symptoms. Sinus mucosal thickening on CT or MRI by itself is not necessarily an indication of clinically significant sinus disease in children.

**CORRELATION BETWEEN CT-SCAN FINDINGS AND TISSUE PATHOLOGY OF ETHMOID SINUSES IN CHILDREN****Fellzardo S. Camllon, Jr., MD, FAAP, Orange, CA**

In a 4 year period, 275 children with chronic sinusitis and abnormal CT-SCANS underwent FESS (functional endoscopic sinus surgery). Among them, 28 patients (10%) had normal ethmoid sinuses by preoperative CT-SCANS. Intraoperatively, these same patients were found to have diseased ethmoid sinuses. With this observation and knowing that the ethmoid is commonly involved in sinusitis in children, a prospective study was undertaken to assess the degree of correlation between CT-SCAN findings and tissue report pathology. Fifteen children with symptomatic chronic sinusitis but normal sinus CT-SCANS underwent FESS. One patient had in addition, a normal MRI. All fifteen patients had 3 months or more of extensive medical therapy and underwent surgery because of their prolonged clinical course. All fifteen patients had ethmoid sinus disease by pathology tissue reports. Consequently, sinus CT-SCAN may not be so accurate in assessing true ethmoid disease in children. MRI may or may not be as helpful and needs to be further investigated. Decision as to who should have surgery should not be based heavily alone on radiographic findings.

**ENDOSCOPIC SURGICAL MANAGEMENT OF CHRONIC SINUSITIS IN CHILDREN****Nigel R. T. Pashley, MB, BS, FRCS (C), FAAP, Denver, CO**

Since June 1986, we have used a functional endoscopic approach to surgically treat infants and children with chronic sinusitis. In September 1990, we reviewed our experience with 396 children (mean follow-up 26 months, range of follow-up 1 to 4 years). At that time, 345 patients (87.2%) were asymptomatic and showed no clinical sinusitis. We noticed, however, that some children had recurrence of their disease after long, disease-free intervals; some of these children required additional surgery.

In 1992, a review of the entire group of patients at a mean follow-up of 50 months (range of follow-up 3 to 6 years) showed that 302 (76.2%) were still asymptomatic. Thirty children (7.6%), however, had required 44 additional surgical procedures. Although sinus irrigation was all that was needed in 8 of these patients, surgical revision was required in 22; a total of 19 procedures was required in 5 patients.

It is clear from this series that, in the pediatric population, it is prudent to warn parents that the surgical results of functional endoscopic sinus surgery are good; however, the complete abolition of all symptoms is not always possible. Long-term follow-up would seem to be one of the only valid means of evaluating children with sinusitis who are treated surgically. Some possible reasons for this are discussed.

**MIDDLE MEATAL STENOSIS IN PEDIATRIC FESS: CAUSES, PREVENTION, AND MANAGEMENT****Rande H. Lazar, M.D., Ramzi T. Younis, M.D., Memphis, TN**

Middle meatal stenosis is one of the most common causes of failure of functional endonasal sinus surgery (FESS) in the pediatric age group. Many factors may lead to middle meatal stenosis, from local anatomic conditions to a distant environmental disturbance. We reviewed the charts of 478 pediatric patients who underwent FESS between January 1989 and December 1992. Revision surgery was performed on 11% (53 of 478) of patients. Middle meatal stenosis was the most common finding among all revision cases and was also found in 32% of patients undergoing nasal endoscopic examinations 2 to 3 weeks after FESS. The influences of age, systemic disease, severity of disease, preoperative medical therapy, environmental factors, postoperative management, surgical technique, and the surgeon's experience were evaluated. The prevention, management, and etiologic factors of middle meatal stenosis after FESS are discussed in detail.

**ADENOIDS AND PEDIATRIC CHRONIC SINUSITIS**

**John Kokesh, M.D., Mark A. Richardson, M.D., Arnold L. Smith, M.D., Taya S. Higgins, R.N., M.N.**

Quantitative bacterial cultures were performed on the adenoid tissue from a group of 52 pediatric patients to assess the association of adenoid infection with chronic sinusitis. Indications for adenoidectomy were either adenoid hyperplasia with airway obstruction (23 patients) or chronic sinusitis refractory to maximal medical management (29 patients). Infected adenoids, defined by quantitative cultures yielding at least  $10^5$  colonies per gram tissue were found in 4% of the adenoid hyperplasia group and 38% of the chronic sinusitis group. These differences were statistically significant ( $p < 0.01$ ). In all cases of infected adenoids, the organism isolated was either *Haemophilus influenzae* or *Streptococcus viridans*. These results suggest that there is an association between pediatric chronic sinusitis and infected adenoids, and that adenoidectomy should be considered in the surgical management of this disease.

## EOSINOPHILIA IN CHRONIC CHILDHOOD SINUSITIS

Fuad M. Baroody, M.D., Baltimore, MD, Tony Hughes, M.D., Washington, DC, Ralph Hruban, M.D., P. MacDowell, M.D., Robert M. Naclerio, M.D., Baltimore, Maryland.

To investigate the hypothesis that eosinophils are important in the pathophysiology of chronic sinusitis in children, we counted eosinophils in surgical specimens of children with chronic sinusitis and either asthma, no asthma or cystic fibrosis and compared their numbers to those in normal adult sphenoid sinus mucosa harvested during transsphenoidal hypophysectomies. We also correlated the number of tissue eosinophils with disease severity as assessed by preoperative CT scan. Lamina propria and intraepithelial eosinophils were counted separately by two investigators blinded to the clinical classification of the specimens. Since there was an excellent correlation between the counts of the two observers, average counts were used for reporting and statistical analysis of the results.

<u>No. of Eosinophils(Eos)</u>	<u>Lamina propria (Eos/0.5mm<sup>2</sup>)</u>	<u>Intraepithelial (Eos/mm)</u>
Asthma (n=13)	197.7 $\pm$ -	2.9 $\pm$ 0.8*
No. Asthma (n=11)	52.0 $\pm$ 21.3*	2.1 $\pm$ 2.4*
Cystic Fibrosis (n=10)	90.5 $\pm$ 19.1*	2.9 $\pm$ 2.4*
Sphenoid Sinus (n=6)	0 $\pm$ 0	0 $\pm$ 0

Data represent means $\pm$ sem of eosinophil counts from surgical specimens of the right and left sinus mucosa from the above number of subjects from each category. \*p<0.01 vs eosinophil counts in sphenoid sinus mucosa.

Lamina propria eosinophils were higher in the asthma and cystic fibrosis groups compared to the patients with no asthma but this difference did not reach statistical significance (p<0.07). When all disease categories were examined together, eosinophil numbers did not correlate with disease severity as assessed by CT scan. We conclude that eosinophils are a prominent component of chronic sinusitis in children, in particular those with asthma. The degree of eosinophilia, however, does not seem to correlate with disease severity.

**THE EFFECT OF INTRAVENOUS DEXAMETHASONE (IVD)  
ON MORBIDITY IN PEDIATRIC ADENOTONSILLECTOMY  
(ATT)**

**Max M. April, M.D., Noreen D. Callan, RN, MS, LPNP, Donna M. Nowak, BSN, MPS, Mark A. Hausdorff, M.D. Stony Brook, NY**

AT is increasingly performed as an outpatient procedure. The aim of this study was to determine whether steroids reduce morbidity and increase safety. We studied 79 children in a double-blind randomized fashion. Prior to surgery, the treatment group (n=40) received IVD (1 mg/kg up to 16 mg), and the placebo group (n=39) saline. All children underwent electrocautery dissection by 1 attending surgeon, received 2 doses of IV antibiotics and had 6 hours of postop IV fluid. Physiologic and behavioral parameters were all assessed and recorded by 2 nurses. IVD resulted in less vomiting (p=.025) and more oral intake at 6 and 24 hours (p=.046). Three emergency visits were all from the placebo group. Each group had 1 child with postop bleed (no surgery), 1 with pneumonia, and 1 with night terrors. In sum, IVD is safe, increases postop oral intake and decreases morbidity after AT.

**INTRAOPERATIVE STEROIDS IN TONSILLECTOMY**

**Laurie A. Ohlms, M.D., Robert Wilder, M.D., Ph.D., Brian Weston, M.S., Boston, MA**

Pediatric tonsillectomy patients often receive steroids to decrease postoperative morbidity. To investigate the utility of intraoperative steroids, a prospective, double-blind trial was performed. Sixty-nine children were randomized to receive either a single dose of dexamethasone or placebo. Tonsillectomy was performed using standard surgical and anesthetic techniques. There was no difference between groups in terms of demographics or intraoperative blood loss. The use of steroids had no statistically significant effect on postoperative pain, either in the hospital or at home. There was no measurable effect on oral intake, fever, use of pain medication or activity level. In this study, a single intraoperative dose of dexamethasone did not appreciably change postoperative morbidity in children undergoing tonsillectomy.

**EFFICACY OF NON-STEROIDAL ANTI-INFLAMMATORY AGENTS IN MANAGEMENT OF POST-TONSILLECTOMY PAIN: A PILOT STUDY****Robert A. Dattolo M.D., Earl H. Harley, M.D. San Diego, CA**

Tonsillectomy with or without adenoidectomy is one of the most commonly performed operations in this country. Adequate control of post-tonsillectomy pain has been one of the greatest therapeutic dilemmas for Otolaryngological Surgeons. Narcotic analgesics are currently the most common agents used. There are several obvious disadvantages in the use of narcotics. Narcotic-based analgesics currently in vogue bear dual problems of being controlled substances and present an abuse potential, hence the appeal of non-narcotic analgesia for post-surgical pain justifies further clinical studies. European researchers have successfully employed non-steroidal anti-inflammatory drugs (NSAID) with great success in the management of post-tonsillectomy pain. In the United States such clinical applications have not been utilized. The following study is a randomized prospective double-blinded experiment comparing the efficacy of Ibuprofen versus Tylenol with codeine for relief of post-surgical pain in 27 children, ages 6-16, who underwent tonsillectomy or adenotonsillectomy. Pain was measured by parental observation in the postoperative period. Safety was measured by the postoperative hemorrhage rate. There was a statistically significant difference in the pain control and hemorrhage rate between the two groups. We conclude that Ibuprofen is not as effective as Tylenol with codeine.

Due to our relatively small study group, we feel further investigation with larger study populations and possibly newer NSAIDs are warranted.

**OUTPATIENT TONSILLECTOMY AND ADENOIDECTOMY:  
A SAFE AND COST-EFFECTIVE PROCEDURE**

**Suzanne W. Yee, M. D., Charles M. Bower, M. D., Gary  
Petrus, M. D., Robert Weiber, M. D., Little Rock, AR**

Due to changes in reimbursement and spiraling healthcare costs, a large number of traditional inpatient surgeries are now being performed outpatient procedures. This paper is a retrospective review of tonsillectomy and adenoidectomy (T&A) performed during three, 3 month periods. Three groups of patients were examined. Patients undergoing T&A from April to September, 1989 were routinely admitted and served as an inpatient group. Those undergoing surgery from April to September, 1990, and 1993 were routinely discharged on the day of surgery or discharged if they met appropriate discharge criteria, respectively, and are defined as the outpatient group. Complication rates and total hospital costs were compared between two groups. There was a large cost difference between the two groups. In this day of cost conscious healthcare, it is felt that T&A may be performed safely as an outpatient procedure with minimal complications, if appropriate discharge criteria are met.

**OUTCOME VERSUS COST IN PATIENTS WITH TONSILLAR AND ADENOIDAL HYPERTROPHY AND OBSTRUCTED BREATHING DURING SLEEP**

**Scott C. Manning, MD, Debra L. Phillips, BSN, RN, Michael J. Blavatl, MD, Dallas, Texas**

Otolaryngologists are under increasing pressure to improve efficacy in diagnosis and treatment as part of inevitable health care reform. The present study examines cost and outcome factors in the diagnosis and treatment of pediatric patients with obstructed breathing during sleep undergoing tonsillectomy and adenoidectomy. In 520 patients over a one year period, bad outcome events such as postoperative apnea and desaturation were strongly associated with an antecedent history of prematurity, age <3, congenital heart disease, neurologic or craniofacial abnormalities, or failure to thrive. The use of diagnostic tests such as CXR and EKG (\$230.00), polysomnography (\$2500.00), and therapeutic measures such as post-op hospitalization (\$800.00/day or \$1500.00/day ICU) or O<sub>2</sub> saturation monitor (\$300.00/day) can be better focused by clinicians with careful attention to clinical findings and pertinent history.

**SLEEP FLUOROSCOPY FOR LOCALIZATION OF UPPER AIRWAY OBSTRUCTION IN CHILDREN**

**Sharon E. Gibson, M. D., Chicago, IL, Charles M. Myer, III, M. D., Janet L. Strife, M. D., David M. O'Connor, BA, Cincinnati, OH**

The management of children with upper airway obstruction (UAO) in whom previous airway surgeries or concomitant craniofacial or neuromuscular abnormalities exist is complicated by potential obstruction at multiple sites. Sleep fluoroscopy (SF) provides a dynamic representation of relative degrees of obstruction at multiple levels of the pediatric airway. Fifty-five SF studies were performed on 50 infants and children to localize obstructive sites, and assess correlation with findings on operative laryngoscopy and bronchoscopy under spontaneous ventilation. In 24 (44%), endoscopic and SF findings correlated exactly. SF identified a site of UAO in 11 patients with a normal endoscopic exam and multiple sites of UAO in 16 others. Two thirds of these occurred at the hypopharynx and tongue base. SF failed to detect 5 airway abnormalities in 4 patients. The sensitivity of SF for endoscopically verified laryngotracheal lesions was lowest for glottic (67%) and subglottic (70%) locations and higher for tracheal (92%) and supraglottic (100%) sites. SF altered the course of treatment in 26 (47%) children. SF appears to be a valuable adjunct to endoscopy in the identification and management of pediatric UAO when hypopharyngeal collapse or multiple levels of obstruction are suspected.

Videotaped segments of SF with the corresponding endoscopy will be shown for illustrative purposes.

**LARYNGEAL DYSFUNCTION IN INFANTS**

**James D. Sigman, M. D., Richard M. Levinson, M. D., Carl A. Brown, M. D., Minneapolis, MN**

This paper describes a new finding which we refer to as the "dysfunctional larynx". It is characterized by abnormal mobility of the vocal cords, without paralysis or tethering. We have observed this condition in infants and children with cerebral palsy (CP) and bronchopulmonary dysplasia (BPD). CP patients are frequently found to have clinically significant aspiration, partly due to laryngeal dysfunction. BPD patients are sometimes incorrectly labelled as having primary bronchospasm, when in fact wheezing is secondary to a dysfunctional larynx and microaspiration. Videotaped endoscopy of illustrative patients is shown. Children with CP or BPD who exhibit airway problems should undergo laryngoscopy to evaluate for a dysfunctional larynx. To our knowledge, this is the first paper to describe this entity in children.

**ACQUIRED LARYNGEAL LESIONS: PATHOLOGY STUDY  
USING SERIAL MACROSECTIONS****Lauren D. Hollinger, MD, Chicago, IL, Jiann-Chyuan Chen  
MD, Taipei, Taiwan**

This description of acquired laryngeal lesions is presented with a focus on the information derived from the specimens collected for the Laryngeal Development Laboratory at the Children's Memorial Hospital in Chicago from 1975 to 1992. During this period, 115 laryngeal specimens were obtained, 53 of which were found to have acquired laryngeal lesions. Forty-eight specimens were thought to have soft tissue stenoses, including 36 with submucosal mucous gland hyperplasia, 4 with ductal cysts, 12 with submucosal fibrosis and 10 with granulation tissue. Twenty-two specimens had intubation changes (excluding soft tissue stenosis), including 8 with ulceration, 3 with healed furrows, 1 with anterior glottic synechia, 8 with fragmented or distorted cricoid and 4 with cricoid ossification. Some specimens have more than one type of acquired abnormality. This presentation, illustrated with photomicrographs of these acquired lesions, highlights the changes produced by long-term intubation and comments on the etiology of characteristic changes.

**LARYNGEAL ELECTROMYOGRAPHY (LEMG) FINDINGS IN IDIOPATHIC CONGENITAL BILATERAL VOCAL CORD PARALYSIS**

**Robert Berkowitz FRACS, Melbourne, Australia.**

Children with ICBVCP were investigated by LEMG to determine whether LEMG findings had diagnostic or prognostic significance. The posterior cricoarytenoid and thyroarytenoid muscles were tested. Four children aged between three weeks and four years of age were studied. Three had abductor paralysis and were tracheostomy dependent, while a fourth had adductor paralysis requiring a feeding gastrostomy. Two of these patients had other associated anomalies. Normal motor unit potentials were found in all cases with bursts of activity with respiration being demonstrated in three of these. Follow up for a period of up to forty months (mean twenty-seven months) showed no significant clinical improvement in any of the patients. While the term ICBVCP represents a heterogenous group of conditions, the findings suggest that a normal LEMG is a feature of ICBVCP and is of no prognostic value but may have implications to explain its underlying pathology.

**UNILATERAL ENDOSCOPIC EPIGLOTTOPLASTY FOR SEVERE LARYNGOMALACIA**

**Steven M. Kelly, M. D., Steven D. Gray, M. D.,  
Salt Lake City, UT**

Laryngomalacia is the most common cause of stridor in infants. Although the disorder is usually self-limiting, a small number of patients require surgical intervention. There are several reports of endoscopic bilateral reduction of redundant supraglottic tissue (epiglottoplasty) to avoid tracheotomy in selected patients. An episode of mild supraglottic stenosis following bilateral epiglottoplasty at our institution prompted a trial of unilateral epiglottoplasty. Seventeen patients with severe laryngomalacia (apnea, failure to thrive) underwent this unilateral procedure. Two patients required treatment of the opposite side at a later date. There were no complications. Apnea resolved and weight gain improved in all. Unilateral epiglottoplasty may adequately treat severe laryngomalacia in most patients.

**ORBITAL FRACTURES IN CHILDREN**

**Peter J. Koltal, M. D., Ibrahim Amjad, BS, Dale Meyer, M. D., Albany, NY**

The orbit is the boundary between the face and the cranium, thus the pattern of orbital fractures (fxs) may be influenced by the changing craniofacial ratio of the growing child. To test this hypothesis, the records of 40 children (ages 1-16), with orbital fxs (1986-1992), were analyzed for age, site & mechanism of injury, & treatment methods. There were 12 roof fxs, 12 floor fxs, 12 mixed fxs, 3 medial fxs & 1 lateral fx. Roof fxs had a significantly higher incidence among children under 7 years of age. Floor and mixed fxs had a significantly higher incidence among the older children, and were significantly more likely to require surgical repair.

In conclusion, roof fxs are a type of skull fx which occur primarily in younger children as a consequence of the vulnerability of the proportionally larger cranium. Floor and mixed fxs are types of facial fxs which occur primarily in older children as a consequence of the increased vulnerability of the face due to its growth and development.

**Comparison of the Effects of Rigid Internal Fixation and Osteotomies on Midfacial Growth In Rabbits****John F. Laurenzo, M.D., John W. Canady, M.D., M. Bridget Zimmerman, Ph.D., Richard J.H. Smith, M.D., Iowa City, IA**

Cranial rigid fixation and midfacial trauma are known causes of craniofacial growth disturbances in infant humans and animals. This study examined the relative effects of multiple osteotomies, microplate fixation, and soft tissue manipulation on the growing New Zealand White rabbit midface. Infant rabbits were assigned to one of five groups (four experimental, one unoperated control). Experimental groups underwent exposure of the left frontonasal and midzygomatic arch regions with periosteal elevation alone (group 1); osteotomies of the left zygomatic arch and frontonasal suture (group 2); microplating of osteotomies (group 3); or microplating alone at the left zygomatic arch and frontonasal sutures (group 4). At full skeletal maturity, linear and spatial measurements were assessed for various craniofacial regions. Linear data demonstrated significant shortening of the left nasal bones in groups 2-4 ( $p < .05$ ) and left zygomatic arches and orbital diameters ( $p < .05$ ) in groups 3 and 4. Euclidean distance matrix analyses analyzed differences in the spatial morphology of various craniofacial regions. Varying patterns of significant ( $p < .05$ ) restrictive shape alterations were seen in groups 2-4. We conclude that osteotomy and rigid fixation of the midface independently cause significant, widespread craniofacial growth aberrations. Combination of these two factors produces a different yet significant pattern of growth restriction. This study suggests that midfacial rigid fixation and bony manipulation be performed with caution in infants.

**THE NATURAL HISTORY OF PROGRESSIVE / FLUCTUATING SENSORINEURAL HEARING LOSS IN CHILDREN**

**Patrick E. Brookhouser, M. D., Omaha, Don W. Worthington, PhD., Salt Lake City, UT, William Kelly, MS, Omaha, NE**

A child with fluctuating and/or progressive sensorineural hearing loss (FPSNHL) presents both a diagnostic and therapeutic challenge. To judge the efficacy of any therapeutic regimen, one must consider the natural history of untreated FPSNHL in children and adolescents. This study involved 95 children and adolescents (62 males, 33 females) aged 1-21 years when they experienced a 20 dB or greater decrease in auditory acuity at one or more frequencies: 500, 1000, 2000, or 4,000 Hz. Results include 180 ears of the 95 patients, the remaining 10 ears being normal hearing or anacusic. Each 20 dB or greater decrement at each of the four test frequencies was considered an "episode, frequency specific thresholds were classified as improved (10 dB or greater), stable (+/- 5 dB) or worse (10 dB or more). The probability of 10 dB or greater improvement in thresholds ranged from .50 to .56 across frequencies while the probability of stable thresholds ranged from .28 to .32. The probability of an additional loss of 10 dB or more ranged from .11 to .20. Investigators assessing efficacy of a potential therapy for FPSNHL in children must consider the relatively high probability of spontaneous improvement or stabilization of auditory thresholds documented in this study after a sudden decrement in hearing.

**NONSURGICAL MANAGEMENT OF "SURGICAL" OTITIS MEDIA WITH EFFUSION****Richard M. Rosenfeld, M.D., M.P.H., Brooklyn, New York**

Based on a meta-analysis of steroids for otitis media with effusion (OME), a protocol was derived for combined steroid-antibiotic therapy of refractory effusions. Of 249 consecutive children with OME referred over a 12 month period, 122 had "surgical" disease defined as chronic effusions (bilateral OME at least 3 months, or unilateral OME at least 6 months) despite one or more courses of a beta-lactamase stable antibiotic. After balancing benefits against risks (e.g., exacerbation of varicella), 71 families received oral prednisilone, 1 mg/kg/d, plus a beta-lactamase stable anti-biotic for 10 days. Complete short-term resolution occurred for 22% of bilateral effusions and 77% of unilateral effusions; odds of resolution were 11 times higher for unilateral disease ( $P < .001$ ). These results support combined steroid-antibiotic therapy prior to surgery for most children with unilateral OME and for selected bilateral cases. Selection criteria and results of long-term control with chemoprophylaxis will be presented.

**EFFECTIVENESS AND SEQUELAE OF INTERVENTIONS OF OTITIS MEDIA WITH EFFUSION (OME)****Robert J. Ruben, MD, Bronx, NY**

The purpose of this study is to compare effectiveness and sequelae of interventions for OME. Effectiveness is measured by the threshold of hearing, and the number of episodes of acute otitis media (AOM). Sequelae are measured by the morbidity associated with the intervention. Published studies of outcome and morbidity were reviewed and analyzed. It is concluded that restoration of hearing is accomplished sooner and more frequently with surgery than with antibiotics and the reoccurrence of AOM is reduced by both. The sequelae of surgical therapy, otorrhea, tympanosclerosis, post-operative bleeding etc. are usually limited in time, are predominantly not life threatening and are limited to the patient. The sequelae of medical therapy, allergy, the creation of antibiotic resistant bacteria, etc. are lifetime and/or life threatening morbidities of which some have a deleterious effect on society beyond the patient. Both effectiveness and sequelae must be considered in determining the use of an intervention.

**ACUTE OTITIS MEDIA AND FACIAL PARALYSIS IN CHILDREN**

**Clark A. Elliott M.D., F.R.C.S.(C), Edmonton, Canada, George H. Zalzal M.D., Washington, DC, Wendy Gottlieb, BA, Charlottesville, VA**

It is a widely-held belief that facial paralysis resulting from acute otitis media will rapidly resolve following adequate treatment of the infectious process. We reviewed our experience with ten patients treated at Children's National Medical Center over a ten year period. All patients were treated initially with broad spectrum intravenous antibiotics alone or with myringotomy. Eight patients with incomplete paralysis rapidly improved. Two patients with complete paralysis, confirmed by neurophysiologic testing, underwent mastoidectomy when they failed to improve after initial myringotomy. The facial nerve was not decompressed in either case. Return of facial function was good to excellent in both patients but up to six months was required for full recovery. We compare our experience with other reports in the literature including those advocating facial nerve decompression and find no significant difference in outcome. We conclude that patients with incomplete paralysis can expect rapid improvement following adequate treatment of their infection. Patients with complete paralysis may expect a more protracted recovery. Mastoidectomy is indicated in complete paralysis to ensure a more rapid resolution of the infection and to rule out more sinister processes masquerading as acute otitis media. Facial nerve decompression does not appear to be a requisite for satisfactory return of facial function.

**ACUTE MASTOIDITIS IN CHILDREN, 1982-1983:  
A RETROSPECTIVE ANALYSIS OF A MODERN  
PERSPECTIVE**

**Earl H. Harley, M.D., Washington, DC, Robert Berkowitz,  
M.B., Theo Sdralis, M.B., Melbourne, Australia**

A retrospective study of acute mastoiditis from 1982-1993 in 58 children aged between three months and 15 years (median age 12 months) is reported. There was no prior history of otitis media in 55% of the patients. Surgery, in addition to antibiotics was required in 41 patients. This was either myringotomy (without or without tube insertion) or mastoidectomy. There was no statistical difference in the outcome between these surgical choices. Organisms were cultured in 48% of cases, the most common bacteria identified being streptococcus pneumonia. We conclude that in the absence of a subperiosteal abscess or central nervous system extension, conservative surgery is appropriate initial therapy in acute mastoiditis in children.

**PEDIATRIC TYMPANOPLASTY: A TEN-YEAR EXPERIENCE**

**Sujana S. Chandrasekhar, M.D., John W. House, M.D., Los Angeles, CA, Uday Devgan, B.S., Washington, D. C.**

Controversy exists in the literature over the correct timing of pediatric tympanoplasty. Many surgeons do not advocate closure of perforations in children. We feel differently. Our results over a 10-year period are presented for 381 ears in 318 patients who underwent tympanoplasty. Three age groups were analysed: 0-8 years (n=146), 9-12 years (n=171), and 13-18 years (n=64). Variables evaluated include: age, gender, size and location of perforation, mechanism of perforation, mucosal status, dry vs. draining ear, prior myringotomy and tubes, ossicular status, type of repair, and status of the contralateral ear. Average length of follow-up was 29 months, with the greatest length of follow-up being over 14 years.

The number of prior myringotomies and tubes was related to both hearing and healing outcome ( $p < .03$  and  $p < .05$ , respectively). Hearing outcome was also significantly better in the patients who underwent type I tympanoplasty as compared with those who required ossicular reconstruction. Those with a normal contralateral ear had a significantly higher success rate (84.6%) than did the children with an abnormal opposite ear (66.3%) ( $p < .001$ ). Only 4.3%, 7.5% and 6.7% in the three age groups required postoperative myringotomy and tube insertion into an otherwise healed graft.

There was **no** significant difference in healing between the three age groups, with persistent perforation rates of 10.1%, 8.1%, and 0.0%, respectively. Nor was there a difference between age groups in the percent of cases with a postoperative air-bone gap of  $\leq 10$  dB (47.4%, 50.0%, and 46.4%, respectively). The successful outcomes in all three groups suggest that tympanoplasty may be performed in children of all ages.

**ENDOSCOPES IN PEDIATRIC CHRONIC EAR SURGERY**

**Seth Rosenberg, M. D., Herbert Silverstein, M. D., Michael Hoffer, M. D., Mark Nichols, M. D. Sarasota, FL**

Although the use of ridged endoscopes has been mainly used in otolaryngology for sinus surgery, their usefulness in otology is becoming more evident. During primary surgery for chronic otitis media 4.0 mm and 2.7 mm, 30° or 70° endoscopes are used to visualize structures in areas not readily seen with the operating microscope such as the eustachian tube, sinus tympani, tegmen, or medial to an intact canal wall.

In our practice a second look mastoidectomy is standard in children who were found to have a cholesteatoma at their primary surgery. During the second look mastoidectomy the mastoid can be inspected using endoscopes through a small postauricular incision. In a preliminary study of 20 patients undergoing a second look mastoidectomy, endoscopic findings correlated exactly with the microscopic inspection performed during the same procedure. In light of this initial study an open second look mastoidectomy may be avoided if minimal or no recurrent cholesteatoma is found during the endoscopic exploration.

The indications, techniques, and findings of otoendoscopy in the management of chronic otitis media in children will be presented.

The use of the ridged endoscope has added another dimension to the standard microsurgical techniques used in pediatric otology.

**DELAYED DIAGNOSIS AND FATE OF CONGENITAL CHOLESTEATOMA**

**Kenneth M. Grundfast, MD, Gurpreet S. Ahuja, MD, Simon C. Parisier, MD, Stephanie M. Culver, BA, Washington, DC**

Congenital cholesteatoma (CC) is not always diagnosed in early childhood. The longer a CC goes unrecognized, the greater is the likelihood of ossicular erosion and extensive invasion into a pneumatized mastoid with labyrinthine fistula, or facial paralysis. Charts were reviewed for 25 patients who had extensive cholesteatoma meeting criteria for diagnosis of CC with initial detection beyond the age of 3 years (mean = 6.4 years). Key factors leading to detection were parent suspecting or child complaining of hearing difficulty in 13 cases, failed school screening audiogram in 9 cases, and incidental observation of a mass medial to an intact eardrum in 3 cases. In 16 cases, the CC was discovered when the eardrum was examined to seek explanation for hearing loss and in 9 patients the CC was detected at time of myringotomy for insertion of a tympanostomy tube. Fourteen patients had more than one surgical procedure with recidivistic cholesteatoma found in 12 patients. A group of older patients presented initially with complications including facial twitching, or facial paresis. Although a previously unrecognized CC may eventually perforate the eardrum mimicking a primary acquired cholesteatoma (PAC), CC *can* be differentiated from PAC according to mode of presentation, characteristic radiographic and operative findings, and anatomic sites involved. Guidelines for achieving early detection of CC and successful surgical outcome are provided.

**EVALUATION OF VERTIGO IN THE PEDIATRIC PATIENT**

**Terrence P. Murphy, M.D., F.A.C.S, William Boydston, M.D., Ph.D., Atlanta, GA**

Evaluation of vertigo in the pediatric patient is frequently difficult and time consuming. A systematic approach is necessary for the successful diagnosis and treatment of pediatric patients with vertigo. 22 pediatric patients with vertigo were recently treated. Diagnosis ranged from benign paroxysmal vertigo, Meniere's disease, traumatic concussive labyrinthitis, Lyme disease syphilis to autoimmune inner ear disease. History remains the cornerstone in the evaluation of vertigo but vestibular testing and laboratory tests and radiography are often required. Evaluation and treatment of pediatric patients with vertigo requires a methodical systematic approach, the purpose of this paper is to present such an approach.

## **SPEECH PERCEPTION PERFORMANCE IN CONGENITALLY DEAF CHILDREN WITH COCHLEAR IMPLANTS**

**Rodney P. Lusk, MD, Virginia W. Jenison MA, St. Louis, MO**

The cochlear implant is an effective device for improving the speech perception skills of prelinguistically deaf children. We examined the post-operative results of 26 congenitally deaf children implanted with the Nucleus 22 channel device. The children were divided into 4 groups based on their age at the time of implantation: (1) 2-5 years old, (2) 5-8, (3) 8-11, and (4) greater than 11 years old. Each child was evaluated at intervals of 6, 12, 18, and 24 months post-operatively with a battery of age appropriate speech perception tests. Individual results were categorized using a score from 0 (no sound detection) to 6 (open set speech). Average data for all groups showed trends of better scores in children who were implanted at a young age. There was statistical significance ( $p=0.001$ ) between the youngest (1) and oldest (4) groups. It appears that for the congenitally deaf, the younger the child is implanted the greater the benefit.

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## **SOFT-TISSUE SARCOMA OF THE HEAD AND NECK IN CHILDREN AND ADOLESCENTS**

**Andrew T. Lyos, M.D., Helmuth Goepfert, M.D., Mario Luna, M.D., Norman Jaffe, M.D., Houston, TX**

The rarity and diversity of soft-tissue sarcoma (STS) of the head and neck have hindered study of their clinical presentation and response to therapy. Presented are the findings of a retrospective analysis of 83 cases of STS in patients under 20 years of age treated at a single institution between 1970 and 1989. The median age at diagnosis was 10.0 years (range 2 months to 20 years). The most common histologic diagnosis was rhabdomyosarcoma (56 patients) with the embryonal type comprising 80.4%. There were 27 patients with nonrhabdomyosarcomatous soft-tissue sarcoma (NRSTS) which included fibrosarcoma (5), neurofibrosarcoma (5), unclassified sarcoma (5), synovial sarcoma (3), and other NRSTS (10). The overall 5 year disease specific survival for RMS was 63% compared to 78% for NRSTS. Discussed are the prognostic factors and the impact of multimodality therapy on the treatment of these aggressive neoplasms.

**IMPROVED SURVIVAL IN HEAD AND NECK  
RHABDOMYOSARCOMA**

**Erica R. Thaler, M.D., Steven D. Handler, M.D., Richard Womer, M.D., William P. Potts, M.D., Philadelphia, PA**

Treatment for rhabdomyosarcoma (RMS), the second most common head and neck malignancy in children, had undergone vast improvement in the last several decades. Recent improvements in survival largely have been due to the introduction of new chemotherapeutic regimens. We present a follow-up study to a report from our institution showing improvement in survival for patients with head and neck RMS from the 1970's to the 1980's. A retrospective analysis of the management and outcome of 49 patients with head and neck RMS followed from 1980 -1993 suggests continued improvement in survival. Death rates for patients with head and neck RMS dropped from 35% in 1980 -1986 to 19% in 1987-1993. This paper will review these patients' presentations, treatment and outcome, and discuss new chemotherapeutic modalities that may contribute to improved survival.

## **ANGIOFIBROMA: CHANGES IN STAGING AND TREATMENT**

**Diana Radkowski, M.D., Cleveland, OH, Trevor McGill, M.D., Laurie A. Ohlms, M. D., Dwight T. Jones, M. D., Boston, MA**

Nasopharyngeal angiofibroma is a vascular neoplasm which remains a diagnostic and surgical challenge. The clinical presentation, management and prognosis of 23 consecutive cases was retrospectively reviewed over a 16 year period. 96% of patients underwent preoperative computerized tomography (CT). Stage III tumors accounted for 35% of patients evaluated. Preoperative angiography with embolization was performed in 22/23 patients. The degloving approach has largely replaced the lateral rhinotomy for surgical access. Total excision was possible in 21/23 patients. The recurrence rate was 8.7% after an average of 36 months. Factors affecting recurrence were investigated. Given recent advances in anterior skull base surgery, a revised staging system is proposed using CT to differentiate between extra- and intradural intracranial extension. Earlier diagnosis, accurate preoperative staging and preoperative embolization allow for single stage surgical resection with minimal morbidity.

**LYMPHATIC MALFORMATIONS OF THE HEAD AND NECK:  
A PROPOSAL FOR STAGING****Lianne M. deSerres, M. D., Kathleen CV Sie, M. D., Mark A.  
Richardson, M. D., Seattle, WA**

The most common location for lymphatic malformations is the head and neck. These lesions can cause considerable morbidity in the pediatric population given their infiltrative nature and propensity for enlargement with infection. This study proposes a staging system which will enable the otolaryngologist/head and neck surgeon to place patients in prognostic groups. All patient charts from 1983-1993 with the diagnosis of cystic hygroma or lymphangioma were reviewed. In the 56 patients the anatomic location of disease was characterized as being unilateral or bilateral, and suprahyoid and/or infrahyoid. The six possible patient groups were then compared with respect to number of procedures necessary to control disease, pre- and post-operative complications, and persistence of disease. A staging system was developed based on a progression of disease. An exact test for trend confirmed a statistically significant trend of severity of disease from stages I-V in all categories investigated.

**THE ROLE OF EARLY CT SCANNING IN PEDIATRIC NECK INFECTIONS**

**Phillip Saccogna M.D., Terry L. Good, M.D. James E. Arnold, M.D., Cleveland, OH**

83 consecutive cases of pediatric neck infections were reviewed to evaluate the role of early computed tomography (CT). Patients were grouped into two categories, superficial and deep neck infections, and these subdivided into abscess versus lymphadenitis/cellulitis. Presenting features of superficial lymphadenitis and neck abscess were similar, with only 16% of the superficial neck abscesses presenting with fluctuance. Clinical presentation for deep neck infection with or without abscess was similar. All clinical abscesses were treated with immediate surgical drainage and intravenous (IV) antibiotics, with an average hospital stay of 3.5 days following surgical intervention. Use of early CT scans for all deep neck infections and superficial neck infections not showing rapid improvement with IV antibiotics enabled earlier diagnosis of abscess, rapid surgical intervention, and shortened hospitalization compared to patients who did not have early CT scans.

**GRANULOMATOUS LYMPHADENITIS OF THE HEAD AND NECK IN CHILDREN****Dana Suskind, M.D. and Steven D. Handler, M.D., Philadelphia, PA**

Granulomatous inflammation is a common finding in pathological evaluation of chronic lymphadenopathy in children. Controversies exist regarding diagnosis and management of these lesions. Over a ten year period at The Children's Hospital of Philadelphia, a total of 67 children were identified with biopsy-confirmed granulomatous lesions of the head and neck, with atypical mycobacteria accounting for a majority of the cases. The typical presentation was that of a non-tender mass in the cervicofacial area present for weeks to months, unresponsive to antimicrobials. All underwent surgical excision which was curative in 54 patients; 13 children required additional procedures. This review stresses the prevalence of granulomatous lymphadenopathy, its typical clinical presentation, difficulty in diagnosis, and the methods of treatment.

## **THE "HUMMER" - INNOVATIVE SURGICAL INSTRUMENTATION FOR SINUS SURGERY IN CHILDREN**

**David S. Parsons, MD, FAAP, FACS, Columbia, MO, Ribbon  
C. Setliff, III, M. D., North Platte, NE**

A new instrument is available that dramatically alters functional endoscopic sinus surgery techniques in children. Compared to standard instrumentation techniques, the Hummer allows even the most complex sinus cases to be performed with greater precision and safety. It is rotary powered microdebrider with continuous on-site suction of surgical debris and blood. The rotary blade cuts and clamps mucosal vessels, and visibility is greatly enhanced by minimizing the blood loss in the operative field. Edematous, diseased mucosa is not stripped, but is trimmed and preserved. Postoperative healing appears to be much more rapid as exposed bony surfaces are avoided. No complications have occurred in over 250 cases using this instrument.

**INVASIVE FUNGAL SINUSITIS IN BONE MARROW TRANSPLANTATION PATIENTS****Sukgl S. Chol, M.D., Gregory J. Milmo, M.D., Patricia Dinndorf, M.D., Ralph Quinones, M.D., Washington, DC**

Invasive fungal sinusitis (IFS) is life threatening in children who are immunocompromised. The objectives of this study are to assess the prevalence and seriousness of this condition in children with bone marrow transplantation (BMT). Seventy-seven children with BMT were evaluated clinically and radiologically during the course of their disease with 66 patients having pre-BMT radiologic evaluation. Thirteen biopsies were done in nine patients and four biopsies in three patients were positive for aspergillus. There were no major morbidity or mortality from IFS in this group of patients. The high incidence of IFS in children with positive CT findings and their successful outcome with multimodal management suggests that fungal surveillance cultures, imaging of the sinuses and early diagnostic procedures in this high risk population are indicated.

**THE ROLE OF ULTRASONOGRAPHY IN THE DIAGNOSIS AND MANAGEMENT OF RETROPHARYNGEAL INFECTION**

**William F. McGuirt, Jr., M.D., Margaret A. Kenna, M.D. FACS, Richard Towbin, M.D., Pittsburgh, PA**

The differentiation of retropharyngeal abscess from pre-suppurative retropharyngeal lymphadenitis has relied on clinical and traditional radiographic examination including lateral soft tissue neck films and fluoroscopy. Traditional methods, however, are not entirely reliable in such a differentiation. Ultrasound is a non-invasive form of diagnosis that can differentiate suppurative from non-suppurative lymphadenopathy. A prospective study was undertaken to evaluate the role of ultrasound in the management of pediatric patients with retropharyngeal infection. In combination with clinical presentation, ultrasound allowed appropriate medical or surgical management in 100% of the 17 patients in this study. Ultrasound allows serial evaluation of the patient's clinical response to treatment without repeated radiation exposure. In this prospective study, ultrasound compared favorably to computed tomography with contrast.

**THE PLOT THICKENS - TREATMENT OF AURAL *P. AERUGINOSA***

Joseph Dohar, M. D., Margaret A. Kenna, M. D., Robert Wadowsky, ScD., Pittsburgh, PA

*P. aeruginosa* infections of the ear differ from those elsewhere in the body being community acquired in otherwise healthy patients. Treatment is often empiric yet little has been published examining susceptibility patterns and concern exists regarding antimicrobial resistance. In 1,003 children, in vitro susceptibility of oral and IV agents was analyzed. In an additional 231 children, ototopical agents were tested. We found no statistically significant changes in susceptibility patterns over the four-year period. Piperacillin (96%), Trimethoprim/ sulfamethoxazole (46%), and Polymyxin B (99%) were the most effective IV, oral and ototopical agents, respectively. Investigating alternative topical agents that are effective and not ototoxic is necessary.

**BECKWITH-WIEDEMAN SYNDROME AND AIRWAY OBSTRUCTION**

**Frank L. Rimmell, M.D., Andrew M. Shapiro, M.D., Margaret A. Kenna, M.D., Pittsburgh, PA**

Beckwith-Wiedeman Syndrome (BWS) consists of macroglossia, organomegaly and hypoglycemia. Associated airway obstruction has not been previously emphasized. We will present a series of 11 children with BWS, 8 of whom presented with symptoms of airway obstruction. Anterior tongue reduction was successful in relieving articulation disorders and cosmetic deformity but did not result in palliation of airway symptoms. Thus, other measures including tonsillectomy or tracheotomy were required to provide relief of symptoms. We will review this syndrome as well as other causes of macroglossia, methods of management, techniques of tongue reduction and problems encountered in patient management.

**CARDIAC ARREST IN PEDIATRIC OTOLARYNGOLOGY**

Amelia F. Drake, M. D., Chapel Hill, NC

**DETECTION OF LARYNGEAL AND PHONATORY DYSFUNCTION IN PATIENTS WITH OCULO-AURICULO-VERTEBRAL SPECTRUM**

Jeffrey H. Jablon, M. D., Bayside, NY

**AUTOGENOUS POSTERIOR PHARYNGEAL WALL AUGMENTATION**

Steven D. Gray, M. D., Salt Lake City, UT

**BILATERAL CHOANAL ATRESIA AND SOFT PALATE DYSFUNCTION**

Verlia C. Gower, M. D., Detroit, MI

**CONGENITAL NASAL PYRIFORM APERTURE STENOSIS: A GENETIC ASSOCIATION?**

Gregory F. Hulka, M. D.

**UNUSUAL PRESENTATION OF AIRWAY OBSTRUCTION SECONDARY TO RHINOSCLEROMA**

Antoine E. Tarazi, M. D., Bronx, NY

**PEDIATRIC PARANASAL SINUS NEOPLASMS**

Daniel J. Kelley, M. D., Cincinnati, OH

**MANAGEMENT OF MASSIVE HEAD AND NECK NEUROFIBROMAS IN CHILDREN**

John Greinwald, M. D., Norfolk, VA

**THYROID CARCINOMA IN CHILDREN**

Brad Millman, M. D., Danville, PA

**CERVICOMEDIASTINAL THYMIC CYSTS**

Daniel J. Kelley, M. D.

**PEDIATRIC CERVICAL BRONCHOGENIC CYSTS**

Steven M. Kelly, M. D., Salt Lake City, UT

**CONGENITAL MIDLINE NASAL DERMOIDS**

Leila Mankarious, M. D., Iowa City, IA

**ANTERIOR CRICOID SPLIT FOR SUBGLOTTIC STENOSIS:  
A CHANGING SPECTRUM FOR THE 1990s**  
Christopher P. Poje, M. D., Philadelphia, PA  
**PEDIATRIC FLAP TRACHEOSTOMY: AN ANIMAL MODEL**  
Frank R. Miller, M. D., Cleveland, OH

**PEPTIDE GROWTH FACTORS IN HUMAN AIRWAY  
GRANULATION TISSUE**  
Robert F. Yellon, M. D., Pittsburgh, PA

**CONGENITAL TRACHEAL ANOMALIES: PATHOLOGY STUDY  
USING SERIAL MACROSECTIONS**  
Jiann-Chyuan Chen, Chicago, IL

**MANAGEMENT OF BLEEDING IN PEDIATRIC FESS;  
PREVENTION AND TREATMENT**  
Ramzi T. Younis, M. D., Memphis, TN

**DISTRIBUTION OF MAXILLARY AND ETHMOID SINUS DISEASE**  
Rodney P. Lusk, M. D., St. Louis, MO

**SPHENOETHMOIDITIS RESULTING IN CAVERNOUS SINUS  
THROMBOPHLEBITIS AND BILATERAL BLINDNESS**  
T. Oma Hester, M. D., Lexington, KY

**A NEGATIVE SWEAT TEST AND CHRONIC SINUSITIS IN CYSTIC  
FIBROSIS: A CASE REPORT**  
Todd T. Kingdom, M. D., San Francisco, CA

**TUBERCULOUS OTITIS MEDIA IN CHILDREN**  
Troy Callender, M. D., Houston, TX

**ACTIVE IMMUNIZATION USING THE OUTER MEMBRANE PROTEIN  
(OMP) PCP IN THE CHINCHILLA OTITIS MEDIA MODEL**  
John Stanievich, M. D., Buffalo, NY

**QUINOLINIC ACID, AN ENDOGENOUS NEUROTOXIN,  
CAUSES SENSORINEURAL HEARING LOSS**  
Elizabeth Rose, FRACS, Pittsburgh, PA

**POSTOPERATIVE ANALGESIA FOLLOWING MYRINGOTOMY  
AND TUBE PLACEMENT**

David Lawhorn, M. D., Little Rock, AR

**EYE FINDINGS IN HEREDITARY HEARING IMPAIRMENT**

Scott R. Schoem, M. D., Washington, DC

**ENDOSCOPIC REPAIR OF A POST-TRAUMATIC NASAL  
ENCEPHALOCELE**

Cynthia G. Clapp, M. D., Charlottesville, VA

**EFFICACY OF A NEW PLATELET AGGREGATION TECHNIQUE IN  
PRE-OPERATIVE EVALUATION OF PEDIATRIC ADENOTONSILLECTOMY  
PATIENTS**

Mark S. Volk, M. D., DMD, Buffalo, NY

**ARGON BEAM COAGULATION: A NEW METHOD OF  
HEMOSTASIS IN TONSILLECTOMY**

David Bowling, M. D., Gales Ferry, CT

**UNILATERAL FACIAL PARALYSIS IN THE NEWBORN**

Nina Dauerman, M. D., Boston, MA

**FLEXIBLE ENDOSCOPIC EVALUATION OF SWALLOWING  
IN INFANTS AND CHILDREN**

J. Paul Willging, M. D., Cincinnati, OH

**DIAGNOSIS AND MANAGEMENT OF CARDIAC ARREST  
DURING OTOLARYNGOLOGIC PROCEDURES**

**Amelia F. Drake, MD, C. Gaelyn Garrett, MD; David L. Witsell,  
MD; Ann G. Bailey, MD, North Carolina , NC**

Many times pediatric otolaryngologic procedures are a child's first experience with general anesthesia. Five patients who experienced cardiac arrest during tubes, tonsillectomy or adenoidectomy are presented. Malignant hyperthermia is frequently suspected in such instances because of muscle rigidity noted at the time of the arrest. However, other diagnostic entities can present in a similar fashion. The differential diagnosis includes undiagnosed Duchenne's Muscular Dystrophy as well as cardiac irritability due to endogenous or exogenous catecholamines and halothane. The literature is reviewed and the evaluation and management of cardiac arrest during routine pediatric otolaryngologic cases is discussed. Awareness of diagnosis and appropriate treatment is essential to patient survival.

**DETECTION OF LARYNGEAL AND PHONATORY DYSFUNCTION IN PATIENTS WITH OCULO-AURICULO-VERTEBRAL SPECTRUM**

**J. Jablon, M.D., E. M. LeBlanc, M.S., S.A. Gereau, M.D., J.S. Rubln, M.D. Bayside, NY**

Speech disorders are not uncommon in patients with oculo-auriculo-vertebral spectrum (OAVS). They have been attributed to problems with hearing, articulation, and velopharyngeal insufficiency. Laryngeal anomalies have been reported in OAVS, but have rarely been implicated in vocal dysfunction. The purpose of this study was to document laryngeal structure and function in a population of patients with OAVS. Patients with OAVS followed at a specialized craniofacial center constituted the subject population. Subjects were evaluated by acoustic analysis, videolaryngoscopy and perceptual analysis. Acoustic data were analyzed for fundamental frequency, jitter, shimmer, and harmonic to noise. Structural information of the endolarynx was obtained by fiberoptic videolaryngoscopy. Perceptual analysis was assessed by three trained speech pathologists. We found several abnormalities of laryngeal structure and function in this population. Results of this study support a trend that OAVS can affect the structure of the endolarynx resulting in problems with voice production. Based on these findings, we believe that patients with OAVS and speech abnormalities should be routinely evaluated for laryngeal dysfunction.

**AUTOGENOUS POSTERIOR PHARYNGEAL WALL  
AUGMENTATION**

**Steven D. Gray, M. D., Harlan Muntz, M. D., Jeffrey L. Marsh,  
M. D., Judy Plnborough, M.S., Salt Lake City, UT**

The outcome experience using a buckled or folded superiorly based pharyngeal flap to augment the posterior pharyngeal wall is described. The indications (selection of patients) for this technique are given and its role compared to other techniques (sphincter pharyngoplasty and pharyngeal flap) is presented with postoperative videotape. This presentation combines the experience of two major children hospitals with over 35 patients treated through augmentation. When available pre- and postoperative nasometer results are included.

**BILATERAL CHOANAL ATRESIA AND SOFT PALATE DYSFUNCTION**

**Verlla C. Gower, M. D.**

Adequate functional repair of choanal atresia can be a frustrating task. The transnasal or transpalatal approaches are advocated depending upon the nature of the atresia. Restenosis of the neochoanae occurs with both techniques, although the transpalatal approach is felt to be more reliable for maintaining patency. We have examined palatal function in four of our recent patients with unilateral or bilateral choanal atresia who underwent surgical repair and subsequent restenosis. Barium esophagrams were performed which revealed nasopharyngeal reflux. All four patients have undergone a pharyngeal flap; however, restenosis continues to be problematic. Coincidentally, all four patients have CHARGE association and chronic middle ear disease requiring long-term tympanostomy tube placement. These findings suggest an abnormality in soft palate function leading to nasopharyngeal reflux which may be responsible for failure of the choanal atresia repair. We offer an algorithm of diagnostic studies to better characterize this observation.

## **CONGENITAL NASAL PYRIFORM APERTURE STENOSIS: A GENETIC ASSOCIATION?**

**Gregory F. Hulka, MD, Amella F. Drake, MD, Pierre Barker,  
MD, Arthur Aylsworth, MD , Chapel Hill, NC**

Congenital nasal pyriform aperture stenosis (CNPAS) is an unusual cause of nasal airway obstruction in the newborn. Two series of six patients each have been reported. The initial descriptive article outlines the diagnosis and the confirmatory findings on computed tomography. More recently, a single prominent central maxillary incisor has been discovered as an associated dental anomaly. Three children with CNPAS are presented, two of whom have other midfacial anomalies. The world literature on this uncommon anomaly is reviewed. Extensive genetic evaluation of one patient and her monozygotic twin supports the hypothesis that CNPAS represents a microform of holoprosencephaly.

**UNUSUAL PRESENTATION OF AIRWAY OBSTRUCTION  
SECONDARY TO RHINOSCLEROMA****Antoine E Tarazi, MD, Bronx, NY**

Rhinoscleroma is a chronic granulomatous disease of the respiratory tract caused by the Gram negative bacillus *Klebsiella rhinoscleromatis*. The disease affects the nose primarily and patients present usually with symptoms that mimic atrophic rhinitis. We report the case of a 14 year old Mexican girl who presented with bilateral nasal masses, hoarseness and respiratory distress secondary to laryngeal involvement by rhinoscleroma requiring emergency airway management. The clinical presentation, diagnosis, histopathology and treatment options will be discussed and the literature reviewed. The disease is endemic to south and central America, but with the recent influx of new immigrants to the U.S, more cases are diagnosed every year. Therefore, rhinoscleroma should be considered in the differential diagnosis of any patient presenting with rhinitis and laryngeal symptoms.

## **PEDIATRIC PARANASAL SINUS NEOPLASMS**

**Mark E. Gerber, M.D., Daniel J. Kelley, M.D., J. Paul Willging, M.D., Charles M. Myer III, Robin T. Cotton, M.D., Cincinnati, OH**

Paranasal sinus neoplasms are rare entities in the pediatric population. Because these lesions are unusual in children, their diagnosis and management can be difficult. The cases of paranasal sinus neoplasms identified at Children's Hospital Medical Center in Cincinnati over the last 12 years were reviewed. Congenital anomalies were excluded from this retrospective study. Fifteen cases were identified. There were four cases of giant cell and fibroosseous lesions, two cases of aggressive polyposis, two cases of dentigerous cysts, and single case reports of fibrosarcoma, osteoma, meningioma, neuroblastoma, neurilemmoma, rhabdomyosarcoma, and transitional cell carcinoma. A search of the recent English literature discussing the diagnosis and management of pediatric paranasal sinus neoplasms was also completed. The presentation, differential diagnosis, and current treatment options for each of the lesions identified are discussed.

**MANAGEMENT OF MASSIVE HEAD AND NECK  
NEUROFIBROMAS IN CHILDREN**

**John Greinwald, M.D., Craig S. Derkay, M.D., FACS, FAAP,  
Norfolk, VA**

Von Recklinghausen's disease (VRD) is a neurocutaneous syndrome primarily occurring in children with head and neck manifestations in 25-35% of patients. The occurrence of large debilitating and disfiguring plexiform neurofibromas are relatively rare. We present three cases of VRD in children involving the larynx, infratemporal fossa, and the parapharyngeal space that required surgical intervention. Review of the literature demonstrates generally disappointing results with surgical excision. These unique cases represent successful surgical management of deforming head and neck plexiform neurofibromas in children.

**THYROID CARCINOMA IN CHILDREN****Brad Millman, M. D., Danville, PA**

Differentiated thyroid carcinoma in a child is reported. Clinical presentation and management are discussed, with special emphasis on surgical therapy, post-operative radionuclide ablation, and long-term hormonal suppression. Thyroid malignancies in children and adolescents are exceedingly rare, with a reported incidence of less than 3 cases/million/year. Although there is a high incidence of extrathyroidal and nodal metastasis, investigations have demonstrated a favorable prognosis. The literature is reviewed and results of a retrospective analysis are reported in 21 children with differentiated thyroid carcinoma diagnosed and managed over the past 30 years.

**PEDIATRIC CERVICAL BRONCHOGENIC CYSTS**

**Steven M. Kelly, M.D., Leland P. Johnson, M.D., Steven Miller, M.D, Salt Lake City, UT**

Bronchogenic cysts are unusual congenital anomalies usually presenting as mediastinal or intraparenchymal lung masses. Cutaneous and subcutaneous, parasternal, intratracheal, and diaphragmatic locations have also been described. The presentation of these cysts as deep cervical masses is rare. Our review of the literature reveals only seven previously reported cases. We report two recent cases of cervical bronchogenic cysts presenting in children - one as a lower neck mass with mediastinal extension causing tracheal deviation and stridor; the other as an asymptomatic, midline, upper cervical mass mimicking a thyroglossal duct cyst. A literature review and discussion of embryology, patient evaluation and treatment, and distinguishing pathological features are offered.

**CONGENITAL MIDLINE NASAL DERMoids**

**Lella A. Mankarlous, MD, Nancy M. Bauman, MD, Richard J.H. Smith, MD, Iowa City, IA**

Surgical excision is the treatment of choice for nasal dermoids. Most authors advocate a direct midline approach over the nasal dorsum. The approach provides excellent access to the dermoid, which typically follows the undersurface of the nasal bones and dorsal surface of the quadrilateral cartilage to the foramen cecum. However, the midline scar and secondary depression at the radix nasi following complete excision of the dermoid are cosmetically undesirable. We prefer an external rhinoplasty approach with immediate reconstruction of the nasal dorsal defect using costal cartilage. Based on our experience with 9 patients (average age at surgery 3.75 years, average follow-up 4 years, longest follow-up 7 years) this approach neither limits surgical access nor compromises resectability. The cosmetic result is excellent, with minimal external scarring and appropriate nasal projection. Our results suggest that an external rhinoplasty approach with immediate costal cartilage reconstruction of the midline tissue defect should be the preferred method for treating congenital midline nasal dermoids.

**ANTERIOR CRICOID SPLIT FOR SUBGLOTTIC STENOSIS:  
A CHANGING SPECTRUM FOR THE 1990S**

**Christopher P. Poje, M.D., Steven D. Handler, M.D., Lawrence  
W.C. Tom, M.D., Ralph F. Wetmore, M.D., William P. Potsic,  
M.D., Philadelphia, PA**

The anterior cricoid split (ACS) procedure has been an alternative to tracheotomy in selected infants with acquired and congenital subglottic stenosis (SGS) since 1980. A retrospective chart review of 22 children who underwent ACS for SGS at the authors' institution from October 1987 through December 1992 was undertaken. Six children presented with recurrent or refractory croup; sixteen presented with stridor and respiratory failure following extubation. Seventy-five percent of the children with post-intubation stridor were treated prior to January 1990. Recent changes in the critical care management of premature infants resulting in a decreased incidence of acquired SGS are discussed. The clinical manifestations of congenital SGS (whose incidence seems to have remained constant) is also reviewed. A successful outcome for this procedure, allowing for extubation without significant stridor or respiratory distress over a minimal follow-up of 12 months, was achieved in 72 percent of all treated patients. Although the frequency with which ACS must be performed appears to be decreasing, the procedure remains an effective adjunct in facilitating extubation in selected patients.

**PEDIATRIC FLAP TRACHEOSTOMY; AN ANIMAL MODEL**

**Frank R. Miller, M.D., Harvey M. Tucker, M.D., Marc E. Guay, M.D., Thomas Bauer, M.D., Cleveland, OH**

Tracheotomy is a surgical technique used to gain control of the upper airway in the pediatric population. The time honored and most widely recommended technique includes a vertical slit in the anterior tracheal wall with placement of a tracheostomy cannula. Other techniques, such as removal of a tracheal window or tracheal flaps have not gained wide acceptance because of concern for interference with tracheal growth and possible tracheal stenosis. This study investigated the efficacy and safety of a superiorly based flap tracheostomy in a developing pediatric animal model. 25 New Zealand white rabbits (age 10 weeks) were randomized into three groups: 1) control; 2) traditional vertical tracheotomy; 3) flap tracheostomy. After 16 weeks survival the three groups were compared regarding tracheal cross sectional area and circumference. The vertical tracheotomy group had a shorter circumference ( $p=0.01$ ) and a smaller cross sectional area ( $p=0.006$ ) than either the control or flap tracheostomy groups. There were no significant differences between the control and flap tracheostomy groups. This study demonstrates no significant risks of tracheal stenosis or adverse effects on tracheal growth for the flap tracheostomy in a developing animal model. This tracheostomy technique may have a role in the management of long term pediatric upper airway obstruction.

**PEPTIDE GROWTH FACTORS IN HUMAN AIRWAY  
GRANULATION TISSUE****Robert F. Yellon, MD, Leon Barnes, MD; Hugo Gonzalez-  
Valdepena, MD, Pittsburgh, PA**

Little is known about molecular mechanisms of wound repair in airway mucosa. Basic fibroblast growth factor (FGF) and epidermal growth factor (EGF) have been shown to induce formation of granulation tissue in non-airway animal models of wound healing. We therefore used immunohistochemical techniques to look for the presence of FGF and EGF in 12 specimens of granulation tissue from the airways of 10 children and five normal airway specimens from five organ donors. FGF was detected in 10 (83%), and EGF was detected in four (33%) of the 12 specimens. FGF was detected in two, and EGF in none, of the five control specimens. Detection of FGF and EGF in granulation tissue specimens suggests that peptide growth factors may play a role in formation of granulation tissue in human airways.

**CONGENITAL TRACHEAL ANOMALIES: PATHOLOGY  
STUDY USING SERIAL MACROSECTIONS**

**Jlann-Chyuan Chen, MD, Taipei, Taiwan, Henry K. K. Tan  
M.D., Lauren D. Hollinger, MD, Chicago, IL**

This description of congenital tracheal anomalies is presented with a focus on the information derived from the specimens collected for the Laryngeal Development Laboratory at the Children's Memorial Hospital in Chicago from 1975 to 1992. During this period, 115 laryngotracheal specimens were obtained, 22 of which were found to have congenital tracheal anomalies. Six specimens were thought to have tracheomalacia, including 1 with primary tracheomalacia and 5 with secondary tracheomalacia (3 associated with tracheoesophageal fistula and 2 with aberrant innominate artery); 13, trapped first tracheal arch; 1, complete tracheal rings; 2, tracheal cartilaginous sleeve; 3, tracheal agenesis; and 3, tracheoesophageal fistula. Some specimens have more than one type of tracheal anomaly. The poster presentation includes a general classification of congenital tracheal anomalies and is illustrated with color photo-micrographs of representative horizontal histopathologic sections.

**MANAGEMENT OF BLEEDING IN PEDIATRIC FESS:  
PREVENTION AND TREATMENT****Ramzi T. Younis, M.D., and Rande H. Lazar, M.D.,  
Memphis, TN**

Functional endonasal sinus surgery (FESS) has become the surgical procedure of choice for the treatment of chronic or recurrent sinusitis refractory to medical therapy. High success rates and a low incidence of complications have been reported. Exquisite knowledge of the paranasal sinus anatomy and thorough surgical training are essential to obtain good results. Minimizing bleeding during surgery is another crucial factor. Bleeding can obscure the field of vision, hindering surgery and increasing the likelihood of complications. Maximal vasoconstriction of the sinus mucosa enables superb visualization, optimal surgical outcomes, and minimal complications. Bleeding may also result from injury to certain vessels in the sinonasal system. We report our experience in obtaining maximal vasoconstriction, avoiding bleeding, and managing intraoperative or postoperative bleeding in pediatric FESS over a 5-year period.

## **DISTRIBUTION OF MAXILLARY AND ETHMOID SINUS DISEASE**

**Rodney P. Lusk, MD, William McAlister, MD, Ahmed El-Fouly, MD, St. Louis, MO**

Since the maxillary sinus has only one ostia located anteriorly, one could hypothesize that obstruction would result in increased secretions at the ostium. Ethmoid sinuses do not have a single ostia and a similar distribution would not be expected. We examined 114 pediatric coronal CT scans at 6 mm intervals after 4 weeks of broad spectrum antibiotics. There is a significantly higher incidence of disease located anteriorly in the maxillary sinus ( $p=0.004$ ), but not in the ethmoid sinuses ( $p=0.18$ ). This supports the hypothesis that obstruction at the ostium is a factor in causing sinusitis. The amount of disease in the maxillary and ethmoid sinuses can be compared between patients who have undergone endoscopic sinus surgery. There is a significantly greater amount of disease in the maxillary sinus ( $p=0.0003$ ) and the ethmoid sinus ( $p=0.2$ ) of the operated group. A total of 29.31% of the patients underwent endoscopic sinus surgery. Thirty-five percent of the patients had evidence of sinus disease but we continued to manage them medically.

**SPHENOETHMOIDITIS RESULTING IN CAVERNOUS SINUS THROMBOPHLEBITIS AND BILATERAL BLINDNESS****Oma Hester, M.D., and Richard C. Haydon III, M.D.,  
Lexington, KY**

Cavernous sinus inflammation and possible thrombosis are serious life threatening complications of many head and neck infections. Acute sinusitis, most commonly sphenothmoiditis, remains a leading source of such complications. Clinical presentation, early recognition and current management trends are discussed. The incidence, mortality, and morbidity of this complication have decreased significantly since the pre-antibiotic era. Ophthalmologic manifestations such as unilateral blindness or ophthalmoplegia, remain the most common while bilateral blindness has very rarely been reported. Such a case is reported and the literature reviewed and discussed. Management remains controversial but may include surgical drainage of the primary source of infection, aggressive antibiotic therapy, steroids and anticoagulation.

**A NEGATIVE SWEAT TEST AND CHRONIC SINUSITIS IN  
CYSTIC FIBROSIS: A CASE REPORT**

**Todd T. Kingdom, MD, Kelvin C. Lee, MD, Gerd J. Cropp,  
MD, PhD, San Francisco, CA**

The diagnosis of cystic fibrosis (CF) is based on skin sweat chloride testing. A small subset of patients will have equivocal sweat tests with the diagnosis based on clinical grounds alone. Recently, the putative structural gene for CF was localized to chromosome 7. The delta-F508 mutation accounts for approximately 70% of the CF chromosomes with over 200 identified mutations constituting the remainder. It is now possible to screen patients for the presence of these genetic mutations, thus establishing the diagnosis of CF or defining a carrier state. We report an unusual case of a 17 year old male with chronic sinusitis and previously equivocal sweat chloride testing diagnosed with CF after DNA analysis. He was found to be double heterozygote for the delta-F508 and 3849-10KB mutations. This report emphasizes that the child suspected of having CF despite repeated negative sweat chloride testing should be considered for further evaluation using these genetic techniques. This will serve as an important adjuvant tool the pediatrician and otolaryngologist may utilize to confirm the diagnosis in the child with a clinical history strongly suggestive of CF.

**TUBERCULOUS OTITIS MEDIA IN CHILDREN**

**Troy Callender, MD, Newton O. Duncan, MD, Marcelle Sulek, MD, Ellen M. Friedman, MD, Houston, TX**

Tuberculosis (TB) of the middle ear and mastoid is primarily a disease of children and young adults, but the disease has rarely been reported since the introduction of anti-tuberculosis medications in the 1950's. Currently however, the incidence of TB is increasing in the United States as amplified by a 34% rise in the number of cases between 1984 and 1991 for children < 15 years of age. In addition many TB organisms are now highly resistant to anti-TB agents. We present our retrospective experience with TB otitis media from a major children's hospital in a large urban center over the last 10 years and discuss 2 recent illustrative cases, one of which also developed TB meningitis. The correct diagnosis of TB otitis media is often difficult and children may present with otitis media as an initial manifestation of TB. A review of the current evaluation, management, and potential complications of TB otitis media is presented.

**ACTIVE IMMUNIZATION USING THE OUTER MEMBRANE PROTEIN (OMP) PCP IN THE CHINCHILLA OTITIS MEDIA MODEL.**

**J. Stanlevich, M. D. R. Paolini, M. D., J. Rossman, M. D., B. Green, M. D. , G. Zlotnick M. D., R. Deich, M. D., Buffalo, NY**

Non-typable *Haemophilus influenzae* (NTHi) is a leading cause of acute and chronic otitis media in children. We studied the effect of active immunization in chinchillas against PCP, a conserved OMP of NTHi which has been shown to produce bactericidal antibody (Ab). The PCP used was produced in *E. coli* as a recombinant protein. The experimental design consisted of 3 groups (PBS, NTHi strain 1479, PCP) given a primary immunization followed by 2 boosters at 21 day intervals, all in Freund's adjuvant (FA). Antibody titers, bacteriology, and tympanometry were performed. The data showed that PCP presented in FA produced an excellent anti-PCP Ab response (PCP titer >200,000; all others <10). The 1479 (+)-control group produced a high anti-1479 Ab titer. The PBS (-)-control group did not produce Ab. The table below shows bulla culture (BC) and tympanic membrane compliance (TMC). Given these data, we conclude that this immunization protocol does not produce a protective Ab response with PCP. However, the severity of disease was minimized in the group immunized with the entire complement of NTHi OMP's (1479 group). We suspect that either an inappropriate IgG subclass is made by the immune system or that FA may be altering the immunologic responsiveness to the tertiary structure of the antigen. We still regard PCP as an excellent vaccine candidate which may provide protection in a revised immunization protocol.

**QUINOLINIC ACID, AN ENDOGENOUS NEUROTOXIN,  
CAUSES SENSORINEURAL HEARING LOSS.**

**Elizabeth Rose, FRACS; Robert F. Yellon, MD; William J. Doyle, PhD; Margaret A. Kenna, MD; Margaretha Casselbrandt, MD, PhD; Melvin P. Heyes, PhD., Pittsburgh, PA**

Quinolinic acid (QUIN), identified in human and chinchilla middle ear effusions, may be an endogenous mediator of sensorineural hearing loss (SNHL) during otic infections. QUIN may have neurotoxic effects mediated through receptors that are found in the cochlea and brainstem. QUIN solution applied on the round window membrane in 10 chinchillas caused ipsilateral SNHL with a mean loss of 35 dB; SNHL of a similar magnitude was also found in all 10 contralateral ears. The 10 control animals treated with normal saline had no hearing loss. Our results suggest that QUIN applied unilaterally causes bilateral SNHL by systemic or CSF absorption, possibly mediated through binding to central auditory and/or contralateral cochlear receptors.

**POSTOPERATIVE ANALGESIA FOLLOWING  
MYRINGOTOMY AND TUBE PLACEMENT****C. David Lawhorn, M.D, Charles M. Bower, M.D.,  
Little Rock, AK**

Adequate analgesia for the first hour after myringotomy and tube placement may be difficult to achieve. One hundred and twenty-two patients underwent a prospective, randomized, double-blinded investigation comparing myringotomy and tube insertion followed by installation of gentamicin drops (Group I) and myringotomy and tube insertion followed by a combination of gentamicin and 4% lidocaine (Group II). Patients who received 4% lidocaine had lower mean pain scores (2.8) than the control group (4.77), ( $p=0.002$ ). Twenty-seven patients in the control group required rectal Tylenol for treatment of postoperative pain compared to 8 patients in the lidocaine group, ( $p<0.001$ ). There were no episodes of tinnitus or vertigo in any patient. The application of 4% lidocaine and antibiotic drops after myringotomy and tube insertion significantly improves postoperative analgesia.

**EYE FINDINGS IN HEREDITARY HEARING IMPAIRMENT**

**Scott R. Schoem, M. D., Kenneth M. Grundfast, M. D., Washington, DC**

A significant proportion of hereditary hearing impairment (HHI) is associated with eye abnormalities including antimongoloid eye slant, synophrys, lens opacities, heterochromia irides, myopia, retinitis pigmentosa and optic atrophy. Since the ability of an otolaryngologist to recognize syndromic types of HHI depends upon the detection of distinctive physical features, it is important for the clinician to be familiar with those eye findings diagnostic of the syndromes that include hearing impairment. This poster presents a summary of specific eye findings associated with HHI and provides schematic and photographic examples to illustrate the eye findings. Commonly encountered disorders include Waardenburg, Norrie, Goldenhar, Treacher Collins and Usher syndromes. A "pocket guide" of eye findings found in these common disorders is attached in an envelope to the poster and will be available for distribution.

**ENDOSCOPIC REPAIR OF A POST-TRAUMATIC NASAL ENCEPHALOCELE****C Clapp, M.D., D Moore, M.D., D Becker, M.D., J Burns, M.D., CW Gross, Charlottesville, VA**

Traumatic encephaloceles are exceedingly rare in very young children. We report a 6 year old white female with a post traumatic nasal encephalocele status post a motor vehicle accident at age 1. She developed clear rhinitis soon after the accident, and was treated unsuccessfully for allergic rhinitis for the next 4-5 years. A CT and MRI scan revealed an intranasal mass consistent with a nasal encephalocele, and she was referred to the Department of Otolaryngology for treatment. On examination, she had a visible intranasal mass, and after consultation with the Neurosurgical team, it was decided that this would be best treated with an extracranial approach. The intranasal tissue was resected using nasal endoscopes for visualization, and the 1 cm. defect was closed with fibrin glue and an inferior turbinate graft. The patient was discharged in good condition, and has been followed for 8 months without recurrence of her CSF leak.

The endoscopic repair of CSF rhinorrhea and fistulas have previously been reported, however post traumatic encephaloceles are a rare occurrence, and there are no previous reports of endoscopic repair of large encephaloceles in young children. MRI scans and clinical photographs are used to describe the successful use of the nasal endoscope in the treatment of this patient's unusual lesion.

**EFFICACY OF A NEW PLATELET AGGREGATION  
TECHNIQUE IN PRE-OPERATIVE EVALUATION OF  
PEDIATRIC ADENOTONSILLECTOMY PATIENTS**

**Mark S. Volk, MD, DMD, Mauro Grossi, MD, Margaret M. Ballou, RN, Linda S. Brodsky, MD, Michael Pizzuto, MD, Joseph Sweeney, MD, Buffalo, NY**

The use of coagulation studies in the pre-operative adenotonsillectomy population remains controversial. Until now, platelet aggregation studies have been costly and time consuming. A new technique using an impedance lumi-aggregometer has been developed. This is able to determine platelet aggregation responses to adenosine diphosphate, collagen, ristocetin, arachidonic acid and thrombin in one day. This study compares this new procedure with more traditional laboratory methods (PT, PTT and Bleeding Time) in predicting post tonsillectomy bleeding in 131 patients.

**ARGON BEAM COAGULATION: A NEW METHOD OF HEMOSTASIS IN TONSILLECTOMY****David M. Bowling, M.D., Gales Ferry, CT**

A prospective study of hemorrhage post-tonsillectomy was performed in 157 consecutive patients. The procedures were done by the same surgeon using an electrodissection technique. Hemostasis in the tonsillar fossae was achieved by one of three methods: Group 1: electrocoagulation - 51 cases, Group 2: electrocoagulation with suturing of the major bleeding sites - 14 cases, Group 3: argon beam coagulation - 92 cases. Post-tonsillectomy hemorrhage was defined as the patient expectorating fresh blood as opposed to blood streaked sputum. There were no primary hemorrhages. The initial method of hemostasis, Group 1, had 7 secondary hemorrhages (13.7%); suturing was then added, Group 2, and no bleeding occurred. Argon beam coagulation(ABC) was then tried because suturing was time consuming and cumbersome. ABC allows monopolar current to be spread over a wide area, maximizing coagulation on the surface while minimizing deep tissue injury. Group 3 had 3 secondary hemorrhages (3.2%). ABC reduced the incidence of post-tonsillectomy hemorrhage by 10.5%; it is easy to use and more efficient than suturing.

**UNILATERAL FACIAL PARALYSIS IN THE NEWBORN**

**Nina Dauerman, M.D., Michael J. Cunningham, M.D., Roland D. Eavey, M.D. , Mack Cheney, M.D, Boston, MA**

Unilateral facial paralysis may present as an isolated finding in the newborn. We present five children with unilateral facial paralysis whose diagnostic evaluations - history, physical examination, audiologic testing, electroneurography, radiologic imaging studies of the temporal bones and CNS - revealed no underlying syndromic, traumatic, or systemic predisposition. Spontaneous recovery of isolated developmental facial paralysis is unlikely; surgical reanimation techniques are thus a viable option. Controversies regarding the timing of intervention and method of repair in such children are discussed.

## FLEXIBLE ENDOSCOPIC EVALUATION OF SWALLOWING IN INFANTS AND CHILDREN

J. Paul Willging, M.D., Claire K. Miller, M.S./CCC, Colin D. Rudolph, M.D., Ph.D., Cincinnati, OH

The feasibility of flexible endoscopic evaluation of swallowing (FEES) in children is reported. Thirty children with swallowing disorders between the ages of four months and twenty years (median age of 4 years) have undergone this procedure since June 1993. Underlying pathologies present in the study population include tracheoesophageal fistula, subglottic stenosis, laryngeal web, vocal cord paralysis, laryngomalacia, anoxic brain injury, developmental delay, and seizure disorder. After inserting a flexible endoscope transnasally into the hypopharynx, age appropriate foods were given to the children to observe pharyngeal pooling and residue, premature spillage of the bolus into the hypopharynx, laryngeal penetration, and tracheal aspiration. Results obtained from the endoscopic examination are compared to those results obtained with the Gold standard modified barium swallow. Strong correlation was found between the two study modalities. Subtle differences in findings did not alter clinical recommendations regarding feeding programs. Flexible endoscopic evaluation of swallowing can accurately and safely evaluate the pharyngeal phase of swallowing in children. Appropriate feeding programs can be initiated after this examination. The test can also be used to educate parents of the swallowing difficulties experienced by their children and thus improve compliance with treatment recommendations.

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